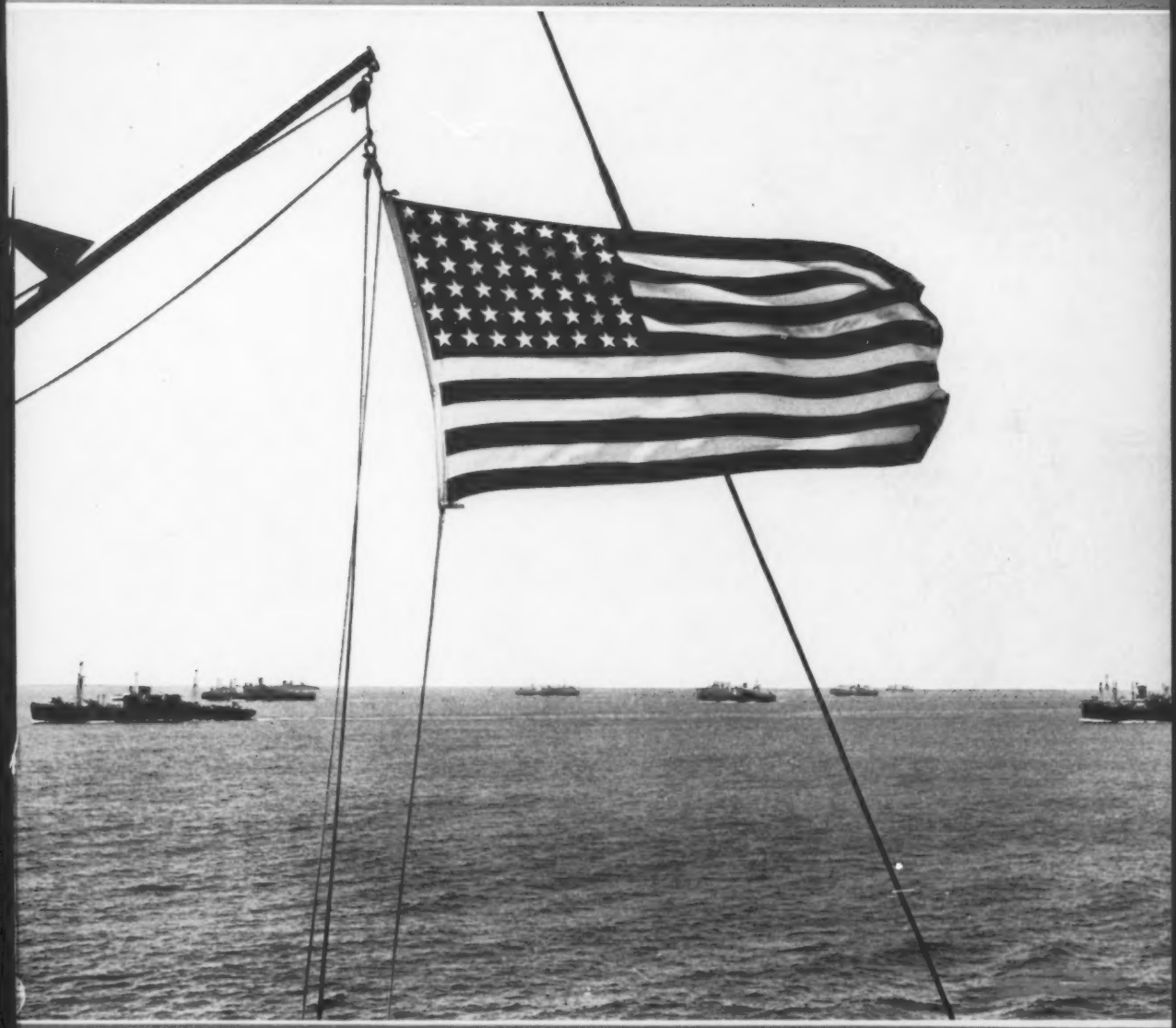
JULY, 1944

JAN 9'45C

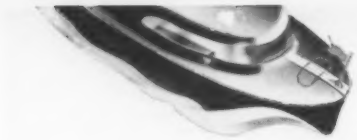
THE Refrigeration Industry

INSTALLATION
MAINTENANCE
MERCHANDISING

AIR CONDITIONING
MACHINERY



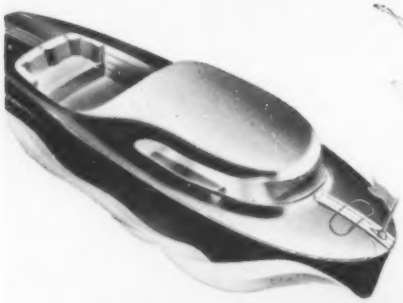
Circulation of This Issue 16,397

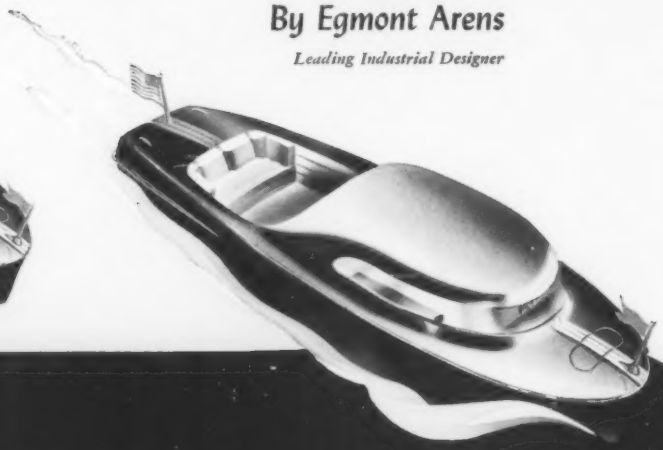


I PREDICT . . .

By Egmont Arens

Leading Industrial Designer





I predict quantity production, right after the war, of unsinkable boats with continuous skins, tougher and lighter than wood, hull and top sides molded in one piece of Co-Ro-Lite, a new molding material consisting of plastic bonded rope fibres. Scale models of such boats are now being tested under a variety of conditions, and hulls of similar construction up to 32' have already been successfully molded. Light weight, speed and low cost will be overall outstanding features. The skin-stressed monocoque construction produces a light weight hull and top. An aluminum aircraft-type engine, housed out of the way in a small space under the aft deck, will provide speed and low operating expenses. Production by molding assures low initial cost, and a one-piece hull, eliminating yearly overhaul and caulking, means low upkeep. Thus motor-boating will be a pleasure everyone can buy with their War Bonds when Peace is restored.

* * *

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Plants: Cleveland, Columbia City, Ind., Los Angeles
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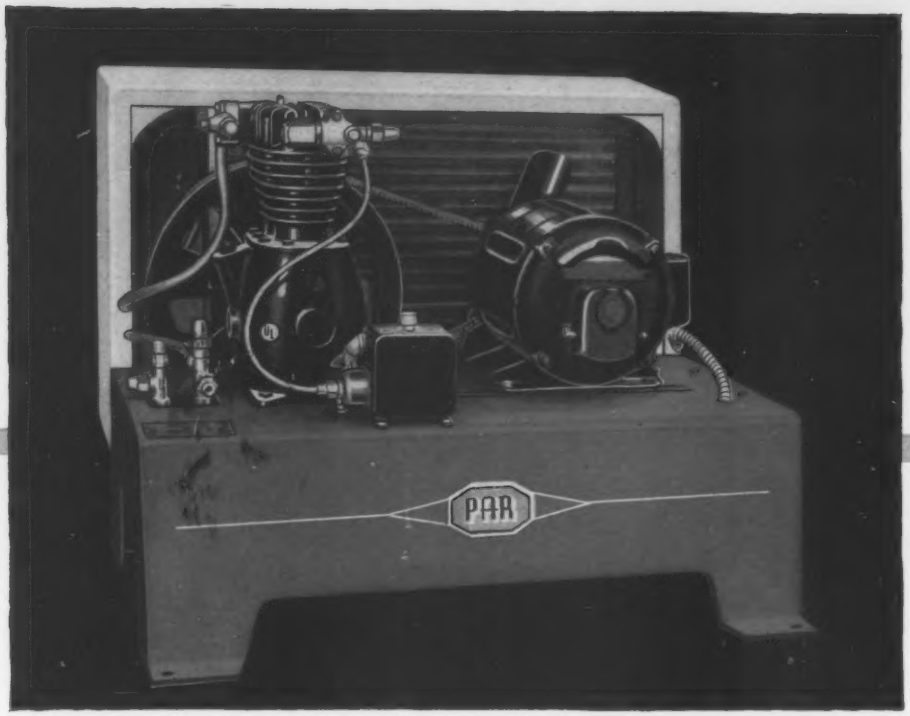
FREE: *Write on company letterhead for "Seeds Of Industry"—a history of The Weatherhead Company, its many facilities and diversified products.*



Par Model HA-10

- For soda fountain . . . meat case . . . walk-in cooler . . . and small dairy cooler applications.
- A 2 cylinder 1 H.P. husky air cooled unit built for economical trouble free service.
- Large condenser, slow speed, fast pump down are outstanding features of all PAR units.
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For Instantaneous Pressure Relief with Fast and Positive Reseating

Design of this relief valve is unique in that it incorporates a diaphragm construction with an unusual seating arrangement. The result is an opening and closing snap-action movement. Large surface area of the pressure actuated diaphragm causes instantaneous relief as compared to gradual opening in conventional spring loaded relief valves. When the pressure in a system reaches the relief point, wire drawing, which may ruin a valve seat, can not take place because there is no slow movement of the valve seat disc in the Henry Diaphragm Relief Valve.

This valve is recommended for protection to a system containing a large charge of freon or methyl chloride refrigerant. It may be employed either for relieving high side or low side to atmosphere. It can also be installed so as to relieve from high to low side of system. It meets the requirements of all existing safety codes. Due to its acknowledged efficiency through dependable performance under all conditions of service, the Henry Diaphragm Relief Valve is today widely used in refrigeration and air conditioning installations of the Army, Navy and Maritime Commission.

The Henry Diaphragm Relief Valve is available in ½" F.P.T., ¾" F.P.T., ⅝" O.D. and ⅞" O.D. Solder connections and at pressures ranging from 90 pounds to 300 pounds per square inch. Each valve is individually adjusted, set at pressures ordered and marked with its rated free air passage capacity per minute. Locking device prevents tampering with pressure setting or changes in setting due to vibration.

FOR FREON AND METHYL CHLORIDE REFRIGERANTS

Type 542. With solder connections. Extended tube sockets at inlet and outlet ports prevent transfer of installation heat to internal parts.

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Type 541. With female pipe thread connections.

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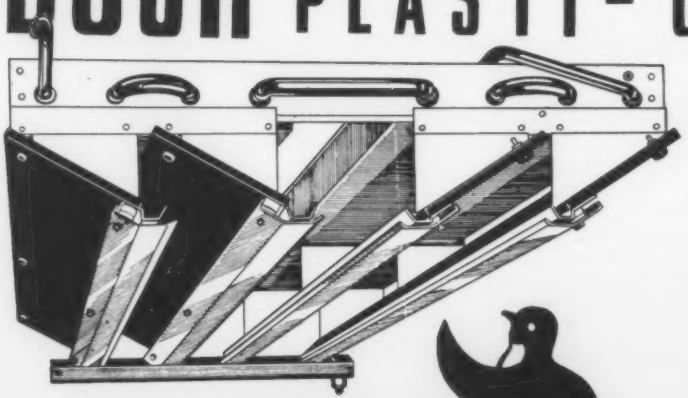
BUSH PLASTI-COOLER



A product of BUSH engineering and research, the BUSH PLASTI-COOLER combines the efficiency of the famed Bush Finned Coil with the proved advantages of sturdy plastics . . . the original application of plastics to the low side field. Many other types available. For advanced engineering . . . BUY BUSH. Ask your Jobber!

BUSH MANUFACTURING CO.

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Of Course there must be good reasons *why*

SALES OF ROTARY SEALS have increased on an average of 77% PER YEAR in the PAST EIGHT YEARS

● Figures speak louder than words. From the time ROTARY SEALS were first manufactured 16 years ago this company has made steady and astounding progress. Eight years ago we thought we had reached our peak in sales, but for the past eight years we have had an average increase in sales of 77% per year.

We consider this a more effective testimonial to the qualities of our seal than anything we might write in the form of advertising.

ROTARY SEAL COMPANY
2020 North Larrabee St. • Chicago 14, Ill.

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(IN RUSSIAN)

GKUZOLC

(IN ENGLISH)

both mean

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Sporlan CONTROLLED PERFORMANCE valves are the *only* thermostatic expansion valves with elements specifically charged to fit the application of the valve. These *selective charges* (G-K-U-Z-O-L-C) are designed to give the best operating characteristics for each type of installation. Only by using SPORLAN valves can you be assured of PEAK Performance on EVERY installation.

Sporlan manufactures Solenoid Valves . . . Magnetic Pilot Controls . . . Modulating Pilot Controls . . . Refrigerant Distributors and the only Thermostatic Expansion Valves with Selective Charges. If your post war plans include refrigeration or air-conditioning write SPORLAN immediately.

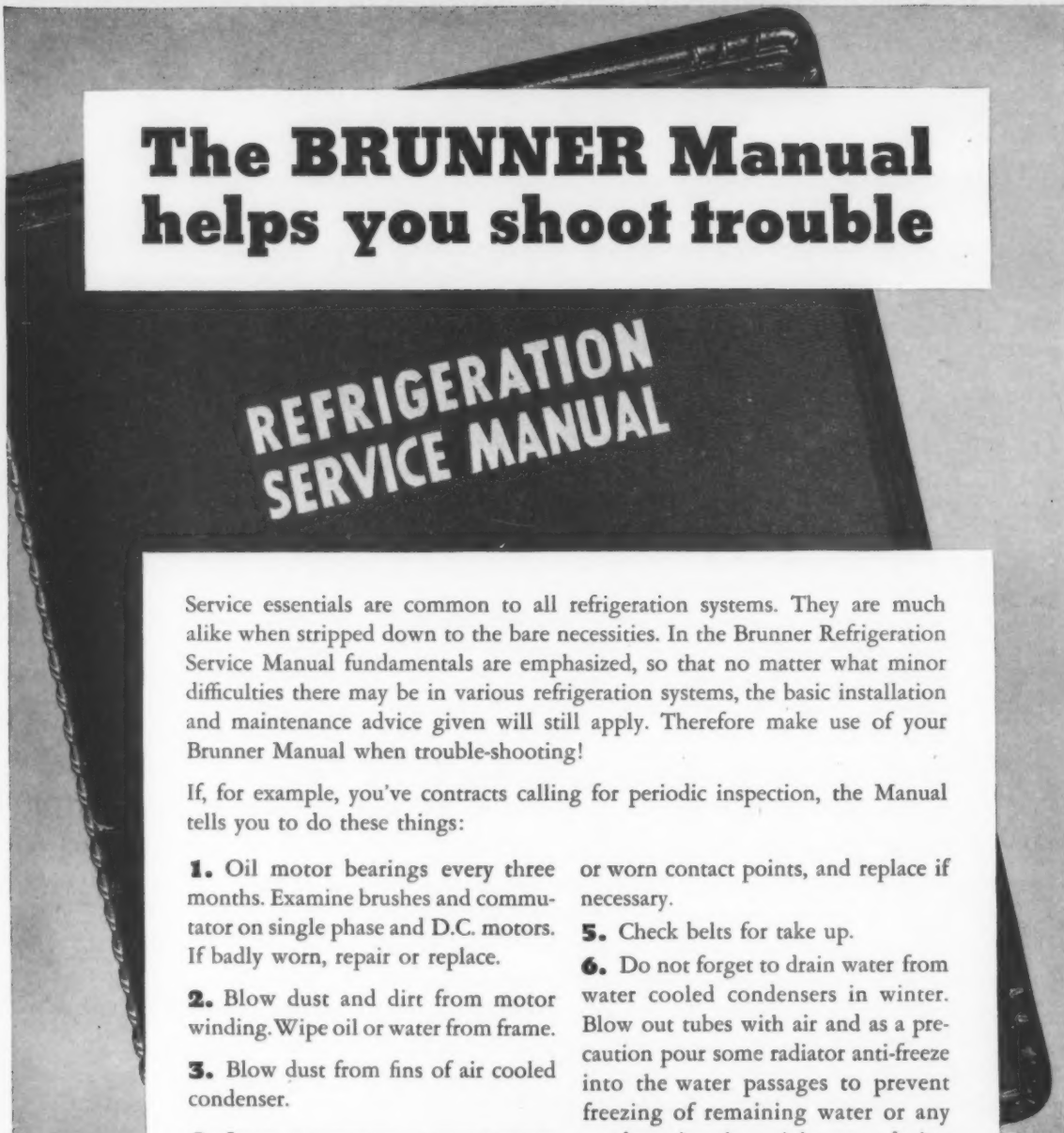
SPORLAN

★ ★ ★ ★ VALVES

SPOEHRER-LANGE CO.

3723 COMMONWEALTH AVE., ST. LOUIS 17, MO.

The BRUNNER Manual helps you shoot trouble



Service essentials are common to all refrigeration systems. They are much alike when stripped down to the bare necessities. In the Brunner Refrigeration Service Manual fundamentals are emphasized, so that no matter what minor difficulties there may be in various refrigeration systems, the basic installation and maintenance advice given will still apply. Therefore make use of your Brunner Manual when trouble-shooting!

If, for example, you've contracts calling for periodic inspection, the Manual tells you to do these things:

1. Oil motor bearings every three months. Examine brushes and commutator on single phase and D.C. motors. If badly worn, repair or replace.

2. Blow dust and dirt from motor winding. Wipe oil or water from frame.

3. Blow dust from fins of air cooled condenser.

4. Inspect pressure or temperature switch, also motor starter for burnt or worn contact points, and replace if necessary.

5. Check belts for take up.

6. Do not forget to drain water from water cooled condensers in winter. Blow out tubes with air and as a precaution pour some radiator anti-freeze into the water passages to prevent freezing of remaining water or any condensation that might occur during the winter.

Many valuable service hints, taken from the Brunner Refrigeration Service Manual, will be included in future advertisements. Right now it is your job to secure more efficient performance and longer life from the refrigeration units you are called upon to service. The Brunner Manual can help you do the job. Use it! If you do not have a copy, we will be glad to furnish one for only $2.50. Write to:

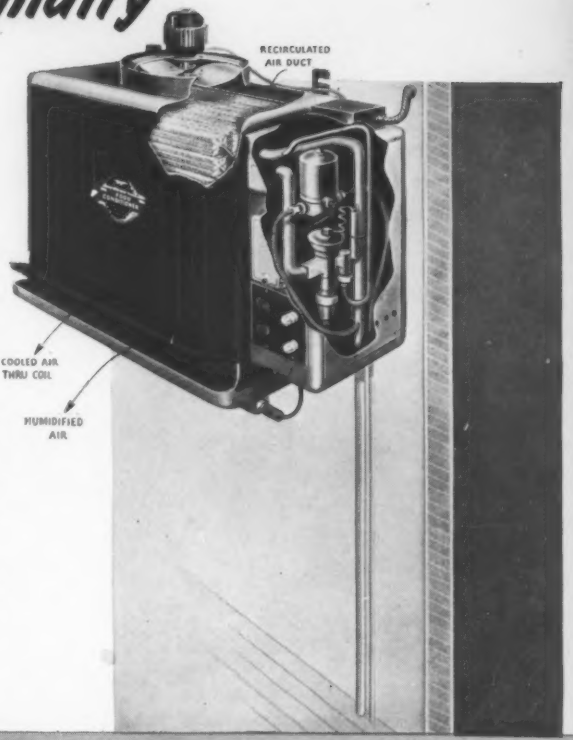
BRUNNER

Brunner Manufacturing Company, Utica 1, New York, U. S. A.

AMCOIL FOOD CONDITIONER

NEW COOLING-PLUS UNIT

Adds High, Controlled Humidity

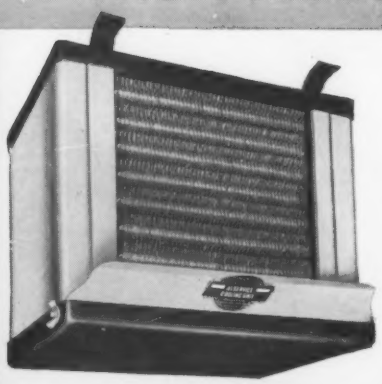


Amcoil Headliner Steps Up Your Sales

Here's something new, different — a practical combination of high, controlled humidities with cool temperatures in a good preserving unit with great commercial possibilities. The recently-announced Food Conditioner spearheads a line of Amcoil-engineered products designed and built to advance refrigeration standards and make sales history.

More than a unit cooler, it combines Cooling Temperatures of 35° to 40° F. and high, controlled humidities up to 85%. Built to be used in Walk-In Boxes. The double job done by this compact packaged refrigeration system preserves and saves foods without dehydration. It's engineered to protect stored fresh meats, fruits and vegetables, perishable foods, butter and cheese, eggs, flowers, bakers' and confectioners' products—and to retard dough.

THESE TWO COMPANION ITEMS ROUND OUT THE PICTURE OF *OPPORTUNITY NOW*



AMCOIL ALSERVICE OPENFACE COOLING UNIT, a standard type forced draft cooling unit. Modern streamline design and in attractive colors, grey and black, it produces temperatures down to 34° F.

AMCOIL ALSERVICE DOWN DRAFT COOLING UNIT, a new type of cooling unit employing some new principles of refrigeration developed by Amcoil Engineers. Convertible to Food Conditioner unit by addition of parts if need for humidity control arises in the future. Temperatures down to 34° F.

As replacement equipment on rated orders of AA5 or better under L-38, these Amcoil units can be delivered now. WPB Task Committee figures indicate that 1944 sales of commercial refrigeration equipment for replacement will exceed $100,000,000 in retail sales value. Get your share of this business with Amcoil-engineered units, embodying the combined technical skill and experience gained in the making of cabinets for testing war products under varying humidities and temperatures from −100° to +160° F.

• AMCOIL •

AMERICAN COILS CO.

25-27 LEXINGTON STREET • NEWARK, 5 N. J.

Factory Representatives

P. J. Burrill • 800 North Clark St., Chicago, Ill.

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Aiding busy wartime hands to accomplish their jobs . . .

IMPERIAL FITTINGS

★ Imperial Fittings for refrigeration and air conditioning work are built to help busy hands get jobs finished with speed and efficiency.

★ Wrench grip is made quick and secure by flats on elbow and tee bodies. Accurate threading, correct seats — resulting from careful quality control and in-inspection methods—make installation speedy and dependable.

★ Nuts, tees and elbows are made from brass forgings. This assures fine grain structure, freedom from internal stress, high tensile strength. It eliminates any possibility of seepage of refrigerants, season cracking or splitting. Imperial fittings will not distort under wrenching—they make tight connections that stay tight and that can be reconnected at will without damage.

THE IMPERIAL BRASS MFG. CO.
536 S. Racine Ave., Chicago 7, Illinois

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Order from Your Jobber

JULY, 1944

VOL. 1, NO. 2

The Refrigeration INDUSTRY

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THE COVER . . . Food preservation, conditioned briefing and chart rooms, medicinal supplies storage, are essentials in naval operations. Modern rerfigeration equipment is a "must" to the modern battle fleet. U. S. Signal Corps Photo.

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All material and data presented in this issue has been reviewed by the necessary Services censorship divisions.

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The Refrigeration Industry

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SILICA GEL SETS
THE STANDARD FOR
DRYING AGENT
RERFORMANCE—No. 3

WILL NOT *Cake* NOR *Powder*

PROCESSED ESPECIALLY FOR THE DEHYDRATION OF REFRIGERANTS

Davison's Silica Gel is a clean, durable material that will neither cake, powder, nor channel. Keeps its scientifically-determined particle size indefinitely under all conditions within the cartridge, permitting perfect diffusion of the liquid. Maximum pore surface area is exposed to the refrigerant at all times.

Davison's Silica Gel has maximum capacity for moisture, oil will not affect it . . . it acts instantly . . . it removes acids that cause corrosion . . . it will not attack metals or alloys. Effective on Freon, Methyl Chloride, Sulphur Dioxide, etc., etc.

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Canadian exclusive sales agents for DAVISON'S SILICA GEL: CANADIAN INDUSTRIES LIMITED, General Chemicals Division

BTU's News • Laws • Trends

DEFERMENTS

REFRIGERATION repairmen over 26 years of age who are in Class 1-A do not qualify for automatic deferment under the new Selective Service rules, and unless they act promptly to have their cases reopened for consideration with a view to 2-A or 2-B classification they still face induction, perhaps before the pool of men under 26 is exhausted. The new draft rules appear to establish a much more favorable case for refrigeration men, but the first move is still up to the registrant or his employer.

Men in the age group 26 through 29 must be able to show that they are "necessary" men in their trade. For all such men a Form 42-A must be filed requesting reclassification into 2-A. Men in the 30 through 37 age group will not have to prove that they are "necessary" to the job, but need only show that they are regularly engaged in refrigeration repair work. However, they must still make sure that a 42-A has been filed for them, if they are now in 1-A.

New rules or not, the man over 30 who is in 1-A and takes no steps to have it changed for occupational reasons may well be taken into the army within the next few months.

NO DOMESTIC REFRIGERATORS

With the stockpile of new household mechanical refrigerators now down to about 15 per cent of its original size early in 1942, when production was stopped, only highly essential military and public health needs can be met. WPB announces that applications from individuals, civilian or military, cannot be considered favorably at this time.

To conserve the limited quantity of refrigerators remaining, it has become necessary for WPB to adopt much more rigid standards in granting releases. In general, consideration at present is limited to requests for food preservation purposes at Army and Navy camps, posts, and ships' service stores; for military, governmental, professional, institutional, or industrial use in storing vaccines, serums, biologicals, and blood plasma; for research and testing laboratories requiring lower-than-normal storage temperatures; and similar uses.

Applications from owners or operators of certain war housing projects also are considered—if it can be shown conclusively that there is no ice delivery service available or that the quantity of ice which can be furnished is insufficient.

WPB warns that it may be necessary to tighten down even further on releases to both armed services and home front so that the most urgent needs may be met from the present stockpile.

Until the war in Europe is over, WPB says, "it is impossible to obtain a clear estimate of the amount of labor, materials, and facilities that may be taken out of war production and used for refrigerator production."

TOOL ALLOYS

USE of higher alloy steels in the manufacture of mechanics' hand service tools has been permitted through recent action taken by WPB in amending Exhibit B to Preference Order E-6. The order provides that no producer shall manufacture any mechanics' hand service tools out of any alloy steel except those which are in the series specified in the Exhibit, or except with specific WPB permission.

OPA ADVISORS

A NINE-MAN advisory committee will assist OPA in working out the pricing problems of commercial refrigeration condensing units. On the newly-appointed committee are: Charles Knox, Baker Ice Machine Corp., Omaha; B. J. Scholl, Brunner Mfg. Co., Utica, N. Y.; V. S. Day, Carrier Corp., Syracuse; Frank J. Gleason, Copeland Refrigeration Corp., Sidney, Ohio; John P. Rainbault, General Electric Co., Bloomfield, N. J.; Harry Newcomb, Servel, Inc., Evansville, Ind.; F. K. Smith, refrigeration division, Tecumseh Products Co., Tecumseh, Mich.; T. S. Pendergast, Universal Cooler Corp., Marion, Ohio; and Marshall G. Munce, York Corp., York, Pa.

LOCKER INSULATION—L-41

THE exception made from Conservation Order L-41 for insulating buildings with certain materials applies only to the insulation of existing buildings without change in the use of these buildings, WPB has ruled. This means that if an existing building is being converted from a store to a frozen food locker plant, the cost of the insulating materials installed must be included as part of the cost of conversion, subject to the cost limitations of L-41—since these materials are being used to convert a store to a locker plant, and not to insulate a store. This ruling is made in Interpretation 7 to L-41.

REFRIGERATED LOAD

RAILROAD refrigerator cars in 1943 carried 41,630,387 tons of perishable freight—mostly fresh food products—an increase of 5,601,355 tons over 1942 and 12,822,847 tons over 1941, the Office of Defense Transportation announces, despite the fact that far less refrigerator car equipment was in operation.

Continued on page 44

Washington S-T-R-E-T-C-H-E-S

The Service Man

A "capital idea" to make work and manpower match during the heavy summer refrigeration season.

REALIZING that united efforts by refrigerator users, repair agencies and refrigerator service men will be necessary during the summer months if even a minimum of necessary repair service is to be provided, the refrigerator repair industry of the Nation's Capital, under the leadership of the Electric Institute of Washington, has set out on a program designed to literally "stretch" the service load as thin as possible so that all of the most essential needs can be met.

Here is the situation which Washington faces with respect to refrigeration service requirements and the manpower available to handle them. In the Capital area, including parts of nearby Maryland and Virginia, there are approximately 200,000 household refrigerators, some 30,000 commercial refrigeration installations. During the summer months, it has been estimated the average refrigeration mechanic can reasonably be expected to take care of about 1000 units. Using these figures, to adequately handle the load in the Washington territory — representing half of the year's total in the three hottest months—would require, at the minimum, 230 service men. Right now there are less than half that number in the area.

So a two-sided job presented itself:

First, each refrigeration service man must be made to become more effective, in his own way.

Second, public cooperation must be enlisted to make the available supply of service men "stretch" to cover the most essential requirements. There must be no more "nuisance" calls, where the service man found the switch off, the plug disconnected, a fuse blown out somewhere in the

MONEY-TIME-TROUBLE!
Now is the time to do THESE NECESSARY THINGS
In the heat of summer, more than ever, you will need efficient refrigeration. Here are 5 simple things which, left undone, may result in an unnecessary service call and the possible loss or spoilage of precious food.
TO PROTECT YOUR ELECTRIC REFRIGERATOR
CHECK THE CIRCULATION OF AIR—The more freely the air moves around your electric refrigerator, the easier it is for the mechanism to do its work. Your refrigerator should be placed so that it is at least 4 inches away from the wall. Overhead cabinets should be at least 24 inches above the top of the box.
DO NOT CROWD YOUR REFRIGERATOR—The circulation of air inside the box plays a big part in the efficient operation of your refrigerator. Place foods in covered containers, if possible. Avoid the use of paper bags and crowding the shelves.
DEFROST REGULARLY—Do not permit more than ¼ inch of frost to accumulate on the sides of the evaporator which surrounds the ice-cube trays. It is this evaporator which absorbs the heat from the food, so if you defrost regularly, your refrigerator will operate more efficiently.
CLEAN OUT THE CONDENSER—Clean out the dust with your vacuum cleaner or with a thin brush which will go in between the tubing. On most refrigerators, the condenser, which looks like an automobile radiator, is found in the motor compartment. If your refrigerator has its mechanism on top, keep it free of dust.
IF IT HAS A BELT—See to it that it is not slipping and is not frayed. The belt is located in the motor compartment of refrigerators which do not operate with a "sealed mechanism".
If your refrigerator is operated by a belt mechanism, it needs occasional oiling. Put a few drops of oil in the oil cups of the motor.
CUT ALONG THIS LINE—THEN ATTACH THIS STICKER TO THE INSIDE OF YOUR REFRIGERATOR DOOR
Even with the best of care, older refrigerators—those which have given years of satisfactory service—may need the attention of a repairman. If your refrigerator stops, it should be given prompt attention. A few simple precautionary steps may save both you and your repairman much time and bother.
On the other side of this sticker are listed 6 steps which you should take before calling a repairman.
While you may be able to remember these steps, the refrigerator may stop when you are not at home. If this sticker is properly filled out and pasted on the inside of your refrigerator door, or some other handy place, anyone who is in the house will know whom to call and can furnish accurate information to the repair company.
Fill in the information called for on the other side of this sticker.
Paste the sticker on your refrigerator door or some other handy place nearby. Moisten the strips of glue at the top and bottom of this section and press firmly.
BETTER CARE—SAVES REPAIR

This "Self-Servicing" folder went to Washington refrigerator owners.

house. There must be an end—for the duration, at least—to the "shopping" habit practiced by some refrigeration owners, where three or four service companies were called in to do a minor repair job, with the first one there doing the actual work and the others blithely told that the housewife "just wanted to be sure that there was somebody coming out to fix it up today."

To accomplish the first of these purposes, that of making each service man a more efficient mechanic in the use of his time and service, a psychological approach was used. Stimulating the effectiveness of the individual mechanic, it was felt, might produce a result equivalent to the addition of at least 10% in experienced manpower. So, as a means of impressing the individual service men with the importance of his work and the seriousness of the situation, a "Certificate of Contribution to Victory," signed by the president and the managing director of the institute, was prepared for each refrigerator service man. With the certificate went a letter from Dr. George C. Ruhland, health officer of the District of Columbia, recognizing the importance of refrigeration and the serious problems presented by war-time conditions in the repair industry, as well as commending each service man for the very real contribution he is making in support of the war effort.

Importance Recognized

"Mechanical refrigeration is now playing such an important part in protecting the health and safety of metropolitan areas throughout the country that there seems little doubt but that the continuance of repairs on this equipment is essential," the letter said.

"The Electric Refrigeration Repair Industry in this area is making a major contribution in support of the war effort. Food preservation, not only in homes, but in distribution through restaurants, retail and wholesale establishments, warehouses and processing plants is particularly important, both from the angle of public health and considering the very great need for conserving the limited supply of food products available under rationing.

"In the final analysis, responsibility for rendering service on essential refrigeration equipment falls upon those experienced mechanics who have remained with the industry. Considering the large number of men from this group who have entered the armed services or are now engaged in other activities, the difficulties resulting from gasoline and tire rationing, the limitations in availability of repair parts and refrigerants, and other war-time problems confronting the industry, much credit is due those individual mechanics who are continuing to supply essential service.

"It is because I realize the essential character of the work done by refrigerator mechanics and the very serious problems which those men are meeting every day, and particularly because I appreciate the tremendous strain which will be placed upon this group during the coming summer months, that I welcome this opportunity of commending those individual mechanics who are going to assume this burden.

Industry Commended

"Both the industry as a whole, and the individuals within that group, are to be very highly commended for the seriousness with which they view their responsibility to the public and the conscientious efforts which they are making to meet essential requirements of the community."

Another point in the program to impress upon the individual mechanic the serious need for his sincerest efforts has been the production of a poster, 28" x 42", in three colors, which has been furnished to refrigerator repair agencies for display in their shops and serves as a continual reminder of the responsibility of the mechanics. The wording on the poster "They have a job to do (the armed forces)—you have a job to do," reflects the fact that skilled mechanics on the home front play an

Continued on page 45

TAYTACH STICKER, THIS SIDE OUT, TO THE INSIDE OF YOUR REFRIGERATOR DOOR!

BEFORE YOU CALL YOUR SERVICEMAN—

IF YOUR REFRIGERATOR CEASES TO OPERATE:

It will save much time and trouble for both you and your refrigerator repair company if you will take the following steps before you phone for service—

1 **BE SURE THAT THE ELECTRIC CORD ON YOUR REFRIGERATOR IS PLUGGED INTO THE BASE OR WALL OUTLET.** It may have been accidentally dislodged.

2 **TEST THE BASE OR WALL OUTLET.** Plug a floor or table lamp into the wall outlet which serves your refrigerator. If the lamp lights, it indicates that current is reaching the outlet.

3 **CHECK FOR A BLOWN FUSE IN THE FUSE BOX.** If the lamp does not light, a blown fuse may be responsible for the lack of current.

4 **CHECK SETTING OF THE COLD CONTROL.** The cold control may have been left at the "off" or "defrost" position.

5 **PROVIDE ACCURATE INFORMATION.** If the above suggestions do not result in satisfactory operation, call your serviceman. Be prepared in advance to furnish the following information to the service company when you phone:

Make of Refrigerator.....
(name of manufacturer)

Age of Refrigerator.....
(approximate number of years since refrigerator was new)

The Service Company which I have selected is:

Name .....

Telephone.....

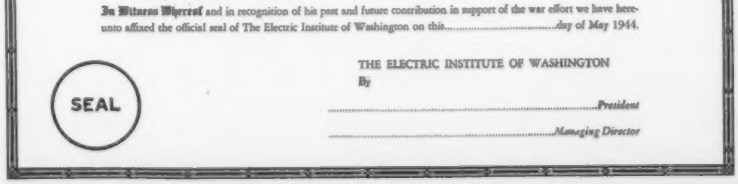
6 **BE CONSIDERATE.** Hundreds of the city's experienced refrigerator repairmen have joined the armed forces. Those who remain are striving desperately to provide essential repair service in order to conserve food and to avoid spoilage. Therefore:

DON'T make final arrangements for repair with more than one repair company. All are busy and none should be expected to make unnecessary calls.

DON'T bother the repair company by additional phone calls after arrangements have been completed.

BE SURE to be at home at the time scheduled for the repairman's call.

This door-sticker asks the housewife to think twice before she calls the serviceman.


THE ELECTRIC INSTITUTE OF WASHINGTON
This is to Certify that
REFRIGERATION MECHANIC
Employed by..... because of his experience and special training in the repair and maintenance of Electrical Refrigeration Equipment and through the conscientious application of this experience during the war, has made a major contribution toward Victory through participating in the protection of the health and safety of those thousands of families dependent upon electric refrigeration for the preservation and conservation of their food, and through assisting in the maintenance of essential refrigeration equipment in the vital food distribution industry in the restaurants, warehouses, retail and wholesale establishments, hospitals and processing plants which serve the nation's capital.
In Witness Whereof and in recognition of his past and future contribution in support of the war effort we have hereunto affixed the official seal of The Electric Institute of Washington on this.....day of May 1944.
SEAL
THE ELECTRIC INSTITUTE OF WASHINGTON
By
.....President
.....Managing Director

"Contribution to Victory" certificates help to impress the serviceman with the importance of his work.

Seasonal

In these days of replacement parts shortages, "Preventive Maintenance" more than pays its way. Here's a What-to-Do and How-to-

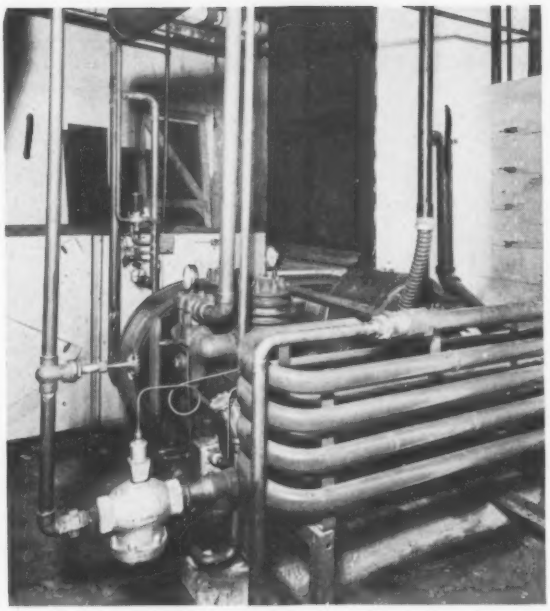
FALL SHUT-DOWN CHECK LIST

CONDENSING UNIT

1. Pump down refrigerant to receiver.
2. Check all parts of system thoroughly for leaks.
3. Remove water from condenser and all water-cooled parts.
4. Protect equipment against freezing by draining all necessary parts.
5. Close water supply valve.
6. Remove fuses from equipment.
7. Protect machine against corrosion.

AIR UNIT

1. Replace or clean filters.
2. Clean heating and cooling coils.
3. Clean and lubricate fan motors.
4. Replace motor brushes when necessary.
5. Check and adjust V-belts.
6. Check for noise and remove any rattles.
7. Check humidifying equipment, spray nozzles, strainers, solenoid valve, and pressure regulating valves.
8. Check all water float valves.
9. Check all thermostats and humidistats.



High sides, after servicing, should be given a coat of anti-rust paint to guard against corrosion.

DURING these trying times, when replacement parts are difficult to get and Freon-12 almost impossible to obtain, preventive maintenance now, more than ever, should be practiced by the air conditioning service engineer. Many emergency service calls and major repair jobs could be eliminated from the mid-season rush if "preventive maintenance" were practiced, especially in the form of seasonal servicing. By "seasonal servicing" we are, of course referring to the late fall pump-down and the early spring start-up.

Unfortunately, even when seasonal servicing is practiced, the service engineer is inclined to consider that his responsibility is limited to the condensing unit only, neglecting to a greater or lesser degree the other component parts of the system which, while not so complex or interesting, are nonetheless equally important to the proper operation of the system.

In order to overcome this tendency on the part of our service engineers, we provide them with an Air Conditioning Inspection Report for each job which itemizes all

Servicing

Do-It plan designed to keep your air conditioning plants operating at top efficiency the year around. A timely and informative article.

By S. R. Guilbert
AIR CONDITIONING ENGINEER
RIESTER & THESMACHER CO.

SPRING START-UP CHECK LIST

Ready for operation after its winter lay-off, this low side equipment has been cleaned and checked.

the parts of the system which should be included in a thorough inspection. The report sheet provides space for the service engineer to record the condition of these parts, and no inspection is complete unless all of these spaces are filled in. The report has space for two inspections, and is so arranged that a quick comparison can be made as to what may have happened to the system since the previous inspection.

Following is the procedure for fall servicing:

Condensing Unit:

1. The system should be pumped down and the refrigerant stored in the condenser or liquid receiver to minimize the danger of leakage. Install a compound pressure gauge in the gauge port of the suction shut-off valve and run the compressor with the liquid receiver outlet valve shut off until the suction pressure is down to zero. It will be necessary to block the low-pressure cut-out contacts closed after the cut-out has opened at

CONDENSING UNIT

1. **Remove anti-rust coating.**
2. **Clean condenser coil.**
3. **Inspect water regulating valve; clean strainer.**
4. **Check starter contacts.**
5. **Replace fuses; check power and control circuits.**
6. **Check belt tension.**
7. **Check water valve, float valve, and overflow drain.**
8. **Check piping for leaks.**
9. **Install gauges, check pressures.**
10. **Check refrigerant charges.**
11. **Remove foul gases.**
12. **Start system, check operating conditions.**
13. **Check all controls and accessories.**
14. **As last operation, recheck entire system for leaks.**

AIR UNIT

1. **Make general inspection of unit.**
2. **Check humidifying equipment.**
3. **Lubricate all motors.**
4. **Check all dampers.**
5. **Check all air filters.**

the low-pressure setting of approximately 10 lbs. gauge indicating that the liquid receiver has adequate capacity to hold the entire charge of refrigerant.

When the gauge shows zero, stop the motor and close the receiver inlet or discharge manifold valve. Now slightly open the liquid receiver outlet valve and allow sufficient refrigerant to flow back into the system until the gauge shows about 20 lbs.; then close this valve tightly. Now shut the suction valve, and the condensing unit is isolated from the rest of the system. The gauge can now be removed from the suction shut-off valve and the pump-down is completed.

If there is more refrigerant in the system than can be stored in the receiver, an auxiliary receiver must be provided or the excess refrigerant will be left in the piping. However, this condition is quite unusual, and will be indicated by the fact that the unit will be stopped by the high-pressure cut-out rather than the low-pressure cut-out.

When the pump-down is completed, a leak test should be made, especially around the valves, to make sure that a gasket, packing gland or flange is not leaking.

2. Where the condenser of a water-cooled unit is exposed to sub-freezing temperatures, the water must be removed from the condenser. It is generally necessary to blow the condenser with compressed air, inasmuch as most condensers are not self-draining. Care should also be exercised in seeing that water is eliminated from any exposed water piping and especially from the body of the water regulating valve.

In those systems which have an evaporative condenser or cooling tower, the same precautions should be taken to eliminate any possibility of freeze-up.

The water shut-off valve should be tightly closed and tagged, and the owner or operator should be cautioned against opening it during the winter months.

3. Fuses must be removed from the main power switch to prevent starting of the system with the water off.

4. A coating of oil or prepared anti-rust fluid should be applied to the entire condensing unit, and especially to those surfaces which are unpainted and inclined to rust.

Air Unit:

1. Remove and replace throwaway type of filters; if filters are of cleanable type, clean and recondition them.

2. Clean the heating and cooling coils with a stiff wire brush, and flush with a water hose, directing the stream against the coils in the opposite direction to the normal air flow. Note that the drain in the condensate pan is carrying the water away adequately, and after flushing out the condensate pan insert the hose into the drain where possible to wash down the accumulation of sludge. Clean and paint any rust spots.

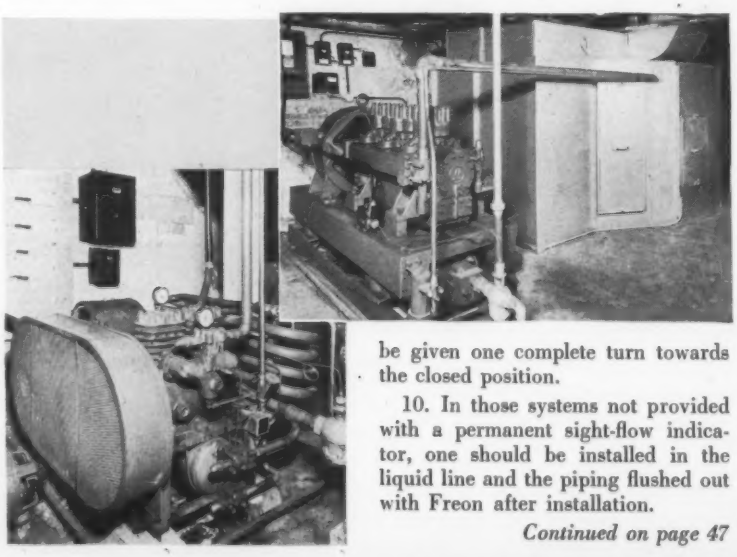
3. Clean and lubricate fan motors. If they are of the brush type, clean the commutators and brushes and replace brushes where necessary. Check belts for condition and proper tension. Check for noises and remove any rattles.

4. Check humidifying equipment. Spray nozzles and strainers should be cleaned, and the solenoid and pressure regulating valves checked. If the system contains a pan-type humidifier, the pan and coils should be cleaned and the float valve checked.

5. Check heating thermostats, humidistats and other controls for proper operation. Inspect the system while the heating equipment is in actual operation, to make sure that everything is working satisfactory.

SPRING SERVICING

When the air conditioning system is to be started up in the spring, the procedure outlined below should be followed:



Condensing Unit:

1. Wipe the condensing unit with a cloth moistened with gasoline or other solvent to remove the anti-rust treatment applied at the fall pump-down. The unit should then be gone over with a slightly oily cloth, leaving an oil film to prevent rust.

2. If unit has an air-cooled or evaporative condenser, clean the coils with a stiff brush.

3. Inspect water regulating valve for worn seat. Clean water strainer.

4. Examine all starter contacts and dress or replace those which are burned.

5. Replace fuses and check power and control circuits to make sure that motor starters respond to their respective instruments. Check for proper rotation of motors.

6. Check for proper belt tension on all belt driven equipment.

7. Remove caution tag from water valve in water supply line and open valve wide. Check float valve in sump of evaporative condenser or cooling tower, and also check the overflow drain to see that it is not obstructed.

8. Install a pressure gauge in the liquid line shut-off valve and note initial pressure. By comparing this reading with the pressure left in the system the previous fall it can be determined at once whether there is a leak in the piping.

9. Install pressure gauges in the liquid receiver shut-off valve and the suction shut-off valve, after making sure that the valves are back-seated. For taking readings, the valves should be given one complete turn towards the closed position.

10. In those systems not provided with a permanent sight-flow indicator, one should be installed in the liquid line and the piping flushed out with Freon after installation.

Continued on page 47

A Service Priority Plan

Present and post-war business prospects play a part in this dealer's method of adapting priorities to his own uses.

PRIORITIES—the very thing that knocked out his household refrigerator business at the start of the War—have been adapted to his own advantage by R. K. Mackenzie, owner of the Parma Electric Shop, Parma, Ohio, in the operation of the refrigerator and appliance servicing operation which has been one of the mainstays in seeing him through these days when "keeping them running" often means the difference between having a business and not having one.

Parma Electric's "priority plan" is strictly a neighborhood affair. At the top of the list are the company's refrigerator users. Most of them are fairly close by, but they needn't be, if they are customers of the company. Wherever they are, they get first call on the Parma Electric servicing facilities. "If they were near enough to sell, they're near enough to service," is the way this dealer puts it.

Next in the preference-list are people who own refrigerators—any make of refrigerator—in the dealership's trading territory. They're good post-war prospects for new models—serving their needs promptly and adequately now will mean more sales when new refrigerators and other equipment are once more to be had. A selfish attitude? Could be, Mr. Mackenzie admits—but no one service organization nowadays can keep up with all the calls it does get, and as long as you have to be choosey anyway, why not do yourself a favor and choose those customers from whom you can reasonably expect post-war patronage?

What servicing time—if any—that remains is spread out among other requests from all over the surrounding territory. But the two preference-classes above generally manage, between them, to supply just about all the calls that the company can efficiently handle.

Now, with the tightest phase of the repair parts situation over and done with, he's able to order far enough ahead to take care of reasonable delivery time, and continue normal activities without crowding his stock to the thin point.

Mr. Mackenzie kept out of the Black Market too—although he had opportunities aplenty, especially on the selling side. But, when he placed the "quick" dollar over against the possibilities of post-war kickbacks, plain common sense dictated that he stay on the straight-and-narrow. Not that he was ever really inclined to this sort of dealing—he'd rather operate his business part-time, or close it up entirely, than operate that way.

A couple of years ago, Mr. Mackenzie says he felt that if conditions continued, he might have to abandon his refrigerator and appliance opera-

Service is the "lifeboat" that has helped pull Parma through today's "storm" of shortages.

tion, or run it on a part-time basis, at best. "But things worked out much better than I had expected," he continues. "When I saw this thing coming on, I thought to myself, 'Service is the lifeboat that will pull us through this storm'. We had built up our refrigerator and appliance service business in the past; all we had to do now was to place the emphasis on it."

Plans Locker Plant

While he is, of course, looking ahead to the day when refrigerators will again be a big-volume sales item for his dealership, Mr. Mackenzie's big interest right now is in the locker storage and processing plant he's planning to build next door to his present quarters. Community zoning restrictions still need to be hurdled, but Mr. Mackenzie is confident that before long he'll be rendering another service to his community—one that will be beneficial to other merchants as well as to himself.

Parma Electric has a staff of three service men—one with a background of experience in the business, the other two newcomers who are recent "graduates" of a recent war-time Training School in Cleveland. Another man—Mr. Mackenzie's son-in-law—helps out part-time. At present he is a welding foreman for a shipbuilding company, but he's picked refrigeration and appliances as a job with post-war possibilities, and he's combining night study with actual shop experience.

During these hot months, the bulk of the company's servicing activities, naturally enough, are devoted to refrigeration—but the organization is set up to service all types of appliances.

"We haven't advertised for service business for a year, now," Mr. Mackenzie says, "but we still get calls almost daily from folks who've seen one of our old advertisements and want us to help them out if we can. Some of them are miles and miles away, and often we just don't have the time to take care of them. We try to, though—especially if they've been referred to us by one of our old customers."

A considerable share of the credit for the company's showing up to now can be posted to the foresight Mr. Mackenzie exercised 'way back in 1941, when the possibility of our entering the War first became apparent. Taking steel production as his gauge, Mr. Mackenzie figured, he says, that the overwhelming demands on our steel production resulting from munitions we were then supplying our present Allies would result in a shortage of durable goods—even repair parts—to some extent all down the line.

So he began supplying himself with repair parts and supplies even then. The result has been that the company hasn't felt nearly the pinch in this respect that many other dealerships have experienced.

The area is a "natural" for such a venture, he believes. Suburban residents pass his place of business daily, on their way to and from work. They stop in the community on their way home to do their shopping—so what could be more sensible than for them to handle their affairs at the locker plant on the same trip? As Mr. Mackenzie sees it, they could bring in their food for processing and storage on their way to work in the morning, and pick up what supplies they need from the plant on their way home at night. The locker plant, if it materializes, will keep open hours that will make such a practice possible.

The projected plant will have space for about 960 lockers, eventually—although the first installation would be limited to 500 units. Processing work will be done in addition to storage, but there will be no slaughtering.

Besides being handy for suburban patrons, the locker plant as Mr. Mackenzie sees it couldn't help but prove a boon to business for every merchant in the shopping community. When patrons take time off to visit their lockers (note to promoters: Mr. Mackenzie already has decided on the type plant he wants) they'll shop for groceries, etc. in the community, too.

And in the post-war years, there ought to be some refrigeration business in those extra shoppers, too.

A "neighborhood plan" of priorities on servicing calls has been carefully worked out.

A locker plant should be a "natural" for the neighborhood appliance dealership, this dealer says.

3,500,000 WOULD BUY A REFRIGERATOR NOW

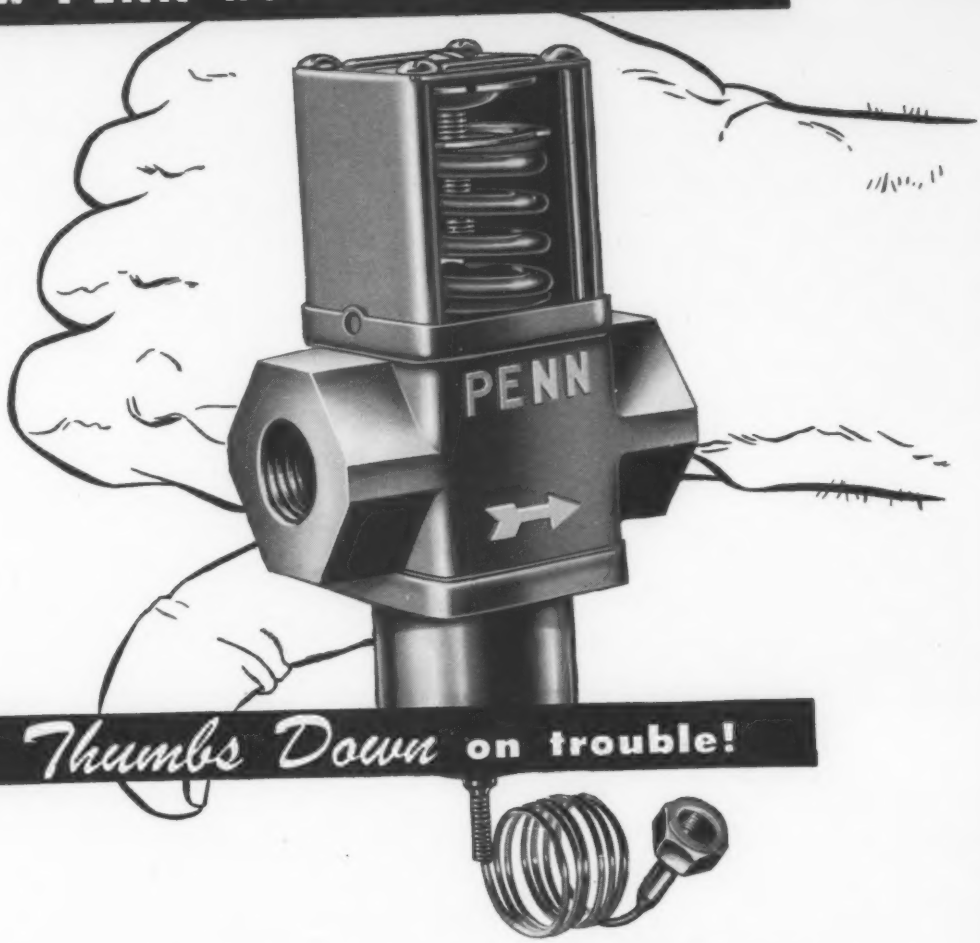
An estimated 3,500,000 families would buy a new mechanical refrigerator right now if production were to be resumed, according to replies obtained by the Office of Civilian Requirements in its third nation-wide survey of civilian preferences and requirements.

The OCR survey, made by enumerators from the Bureau of Census, covered 4,488 households, and the estimated national figures are a projection of information obtained from this number of persons.

Generally speaking, the survey showed that people have accepted the wartime lack of durable goods and appliances without complaint, and that when goods are available again there should be an orderly market rather than the wild buying rush which some people have predicted.

Since the survey covered only those products which households would buy for their own use, the estimated demand for refrigerators, for example, might be increased substantially by purchases by apartment house owners and landlords for their tenants, once new units are available.

new PENN water valve turns . . .



Thumbs Down on trouble!

WATER valve trouble? No more! That's because *advanced engineering design* has eliminated the recurring troubles found in ordinary valves.

But check this new water valve yourself. Is there any chance of sedimentation or rust? Not a bit, for neither the range spring nor any sliding part makes contact with the water. Lubrication worries? Impossible, for the PENN 246 requires no lubrication whatsoever!

Gone is the drain plug . . . yet freezing holds no terror for this valve; rubber diaphragms fully compensate for any expansion. Gone, too, is water hammer, yet the valve is extremely sensitive to head pressure changes.

In short, this new PENN Water Regulator has just what it takes to turn thumbs down on trouble for you. Learn more about it! Send for your free copy of Bulletin R-1986, containing full information. *Penn Electric Switch Co., Goshen, Indiana. —Export Division, 13 E. 40th Street, New York 16, U. S. A.* In Canada: Powerlite Devices, Ltd., Toronto, Ontario.

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

THE SERVICE MAN'S DEPARTMENT

This section of
The Refrigeration Industry
is edited by
Warren W. Farr
Refrigeration Maintenance
Corporation, Cleveland, Ohio

Let's Have More. In inaugurating this department, we asked for service tips which would help save man hours at a time when manpower was at a premium. A splendid example of what such an interchange of ideas can do for the refrigeration service industry is illustrated by the capacitor testing device described elsewhere on these pages. This tool can be constructed from materials readily available at little cost and requires a minimum of effort in assembling.

This is the type of idea that is worthwhile to the fellow who has a problem. While you are thinking about your service tip, why not sit down and sketch the idea you have found to be your greatest time-saver.

—o—

Service Tip. Many service men add gas to a refrigerating machine as a cure-all or first attempt to correct a trouble call. Be sure that more refrigerant is needed before taking this action. A refrigerating machine needs the correct charge of refrigerant to operate efficiently. An overcharge will never make it operate better and many times will decrease the capacity. A *sight glass* installed in the liquid line is a sure method of determining the correct charge. A clear sight glass indicates the proper amount of refrigerant and a foamy or intermittent flow of liquid will determine beyond question a shortage.

This sight glass can be attached to the system as a permanent part or can be used as a service tool and be removed when the repair job is completed. When installing or removing a sight glass from the liquid line, be sure that a slight pressure exists so that there will be no danger of air being introduced into the system.

—o—

New Products. Oil coolers in connection with internal and external grinders offer the service engineer a vast new field in which to sell his services. These systems are comparatively simple, consisting of a shell-type or bare tube low side connected to a condensing unit usually air cooled so that the installation can be kept to a minimum. This equipment is usually controlled by a thermostat that will automatically maintain the coolant temperature at the same level as the surrounding air temperature. These units can be found in increasing numbers at firms who do gauge or thread grinding or those companies that have large numbers of automatic screw machines. Need for these systems arose because of the fact that the coolant temperature would rise consistently due to the frictional heat of grinding, and as the oil temperature increased the part being machined would expand with the result that the finished part, when cooled to room temperature, would contract and be undersized.

The most frequent service complaints are caused from excess oil getting on the belts or in the motor. Extreme care should be exercised to keep the condensing units covered and protected by baffles from oil spray. It is also important to see that all residue from grinding is filtered or settled from the coolant before it is passed through the low side. Removal of this foreign material in the low side causes an insulating effect on the heat transfer surface and reduces efficiency. These installations have come into being during the war period but will be essential to these manufacturers in the post war period. Add this new group to your list of service prospects.

—o—

Caution: Water-Cooled Equipment. Public health enemy No. 1 is polluted water. Under certain conditions cooling water connections made direct with the sewer can cause contamination. An examination of water-cooled refrigerating plants shows that many have these direct connections. A direct connection is one that leads from the water supply line to the sewer without a break. All cooling water discharge lines should terminate over an open floor drain, a trapped sink, or a drain trap and standpipe assembly connected to a sewer riser.

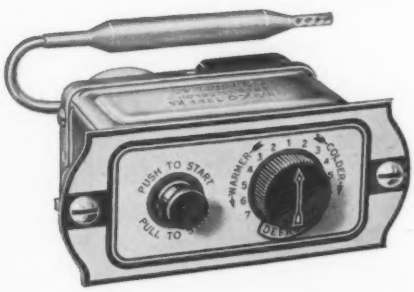
Danger arises when any pipe leads from supply to sewer. The supply may be polluted with sewage and spread the contaminated waters

Continued on page 22

Send a Picture Illustrating Your Idea of Procedure and Win a Prize.

This prize will consist of the new edition of "Modern Gas and Electric Refrigeration" by Althouse and Turnquist. For each picture published, we will send to the contributor this book, which is now being used as the text in the current Refrigeration Industry Training Program.

"What's Joe Got That We Haven't Got?"



This exact replacement Rancostat is but one of many available for general and exact replacements; for domestic or commercial use. Your jobber has complete information on those available.

RANCO Replacement Controls give Serviceman Joe the edge on the other fellows. That is because Ranco offers many outstanding features that make them so desirable. For example: Ranco Controls are beautifully designed and sturdily constructed with stainless steel bases, top frames and side covers. The Overload Protection Unit gives accurate and consistent protection. They are precision made . . . alert, responsive, accurate and dependable. No wonder they are so welcome.

Ask your Jobber about available Ranco Controls

Ranco Inc.

COLUMBUS 1, OHIO

CAPACITOR TESTER

Gentlemen:

The first issue of "The Refrigeration Industry" magazine was well received—and very well read here! We are looking forward to the next edition.

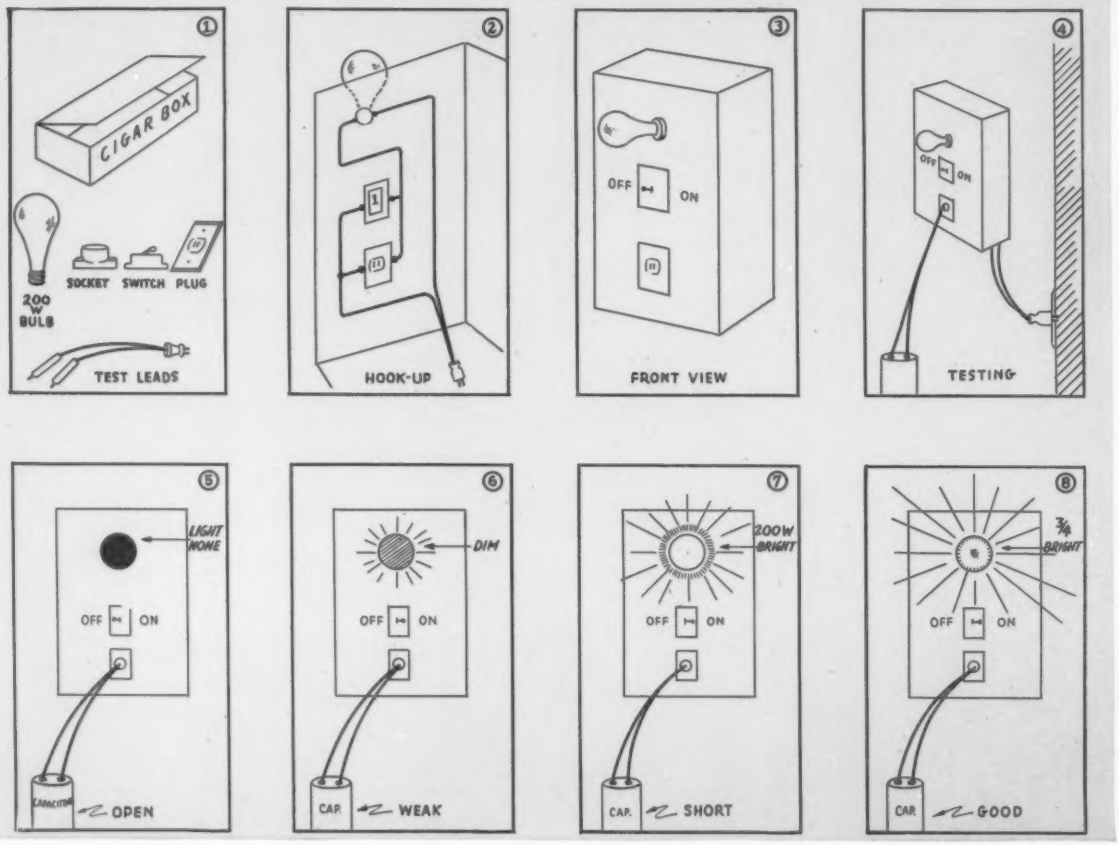
Your offer on Page 21, especially the prize (Modern Gas and Electric Refrigeration by Althouse and Turnquist) intrigues me. Therefore, I am submitting (enclosed) a working diagram of something we have rigged up in our shop here—made of a cigar box. Its purpose is to test the condition of capacitors. This is the *simplest* and one of the most accurate methods used in testing capacitors.

I think that the drawings or diagrams are self-explanatory, except for one point. In Figure 8, if the capacitor is good, the 200-watt bulb will light up to about ¾ brilliance. However, to make certain of this, flick the switch to the "ON" position and you have a direct current to the bulb and it will brighten up to a full 200-watt brilliance. This same method can be used from Fig. 5 to 8.

Well, got another service call, so I'm off.

M. C. Horwitz,
National Appliance Service,
Washington, D. C.

(Editor's note: See that holding charge of current in capacitor does not discharge in less than fifteen seconds. To determine whether current has been dissipated, remove capacitor from test assembly and after fifteen seconds short two terminals with insulted-handle screwdriver. If O.K., a high tension spark should result. It may require several trials to secure this.)



HERE'S HOW . . .

Continued from page 20

throughout large areas. At first this appears unlikely because of the much higher pressure in supply lines than sewers, but frequently the supply line is shut off suddenly and drained and this often results in a reverse of the usual flow. For instance, a city water main may be shut off because of a break or for repairs. While the water is draining from the main, it becomes a syphon, and where direct connections to sewer are present in that area, they pour a constant stream of sewage back into the water supply line while the main is draining. Thus, when the damage has been repaired and the water again turned on the main, the pollution remains in the domestic supply waters. Air bubbles may carry the contamination far beyond the area first polluted so that it becomes difficult to trace the source when epidemics caused by impure water first break out.

Water-cooled condensers on refrigeration compressors are the chief offenders because installations are made after the building has been constructed and are not subject to inspection.

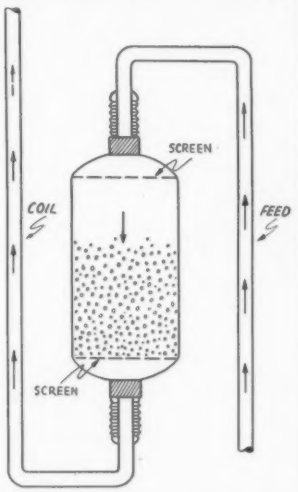
Cold Cabinet Signal. Recently, a service man was called to make repairs on a cold storage cabinet. He found that the repair necessary was minor but since the products in the cabinet had thawed through lack of refrigeration, the damage was costly.

The service man consulted with his jobber and discovered that there was a way to prevent such damage. The jobber showed the service man a control that could be easily and quickly installed to control a signal light or bell. As soon as the cabinet temperature reaches 9°F., the signal light or bell gives warning. The signal continues until the temperature is again reduced to the normal holding temperature of the cabinet, 0°. The jobber also suggested wiring the control to a second circuit to insure safety even in case of power failure.

The value of such a cold cabinet signal control is even greater in wartime—saving much scarce and irreplaceable foodstuffs.

I do it this way...

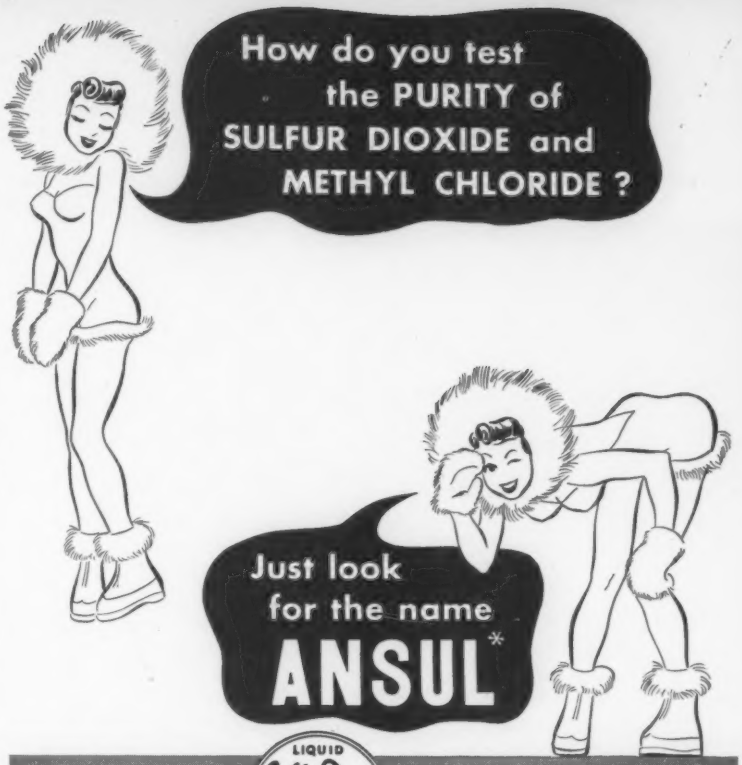
I ALWAYS install dehydrators with the inlet at the top and with a trapped liquid line. I find that most new dehydrators are not packed completely full of a drying agent and, in the course of operation, if they are fed from the bottom or if they are laid on their side, the refrigerant can bypass the drying



agent. Also, the pressure of the refrigerant and the force of gravity make a solid bed of the dehydrating agent and this bed, in addition to dehydrating refrigerant, acts as a filter and keeps dirt and sludge trapped so it cannot wash back into receiver between machine cycles.

Have installed all of my driers in past three years by this method, with good results.

J. Clark, Chicago, Ill.



LIQUID Sulfur Dioxide by ANSUL* — 5, 10, 25, 70, 100 and 150-lb. Cylinders

LIQUID Methyl Chloride by ANSUL* — 3, 6, 15, 40, 60, 90 and 130-lb. Cylinders

Available in carload lots or handy cylinders sized for servicemen's needs.

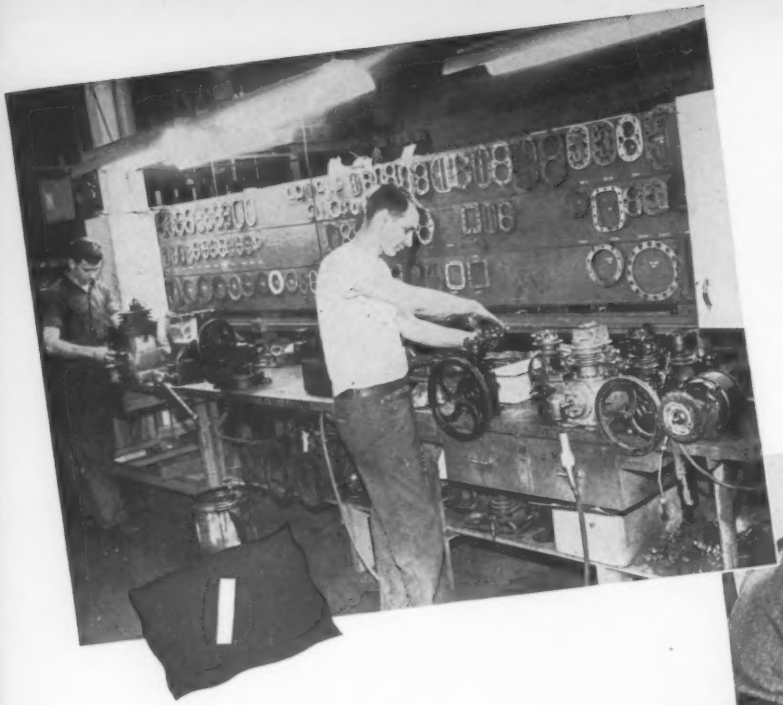
ORDERS FILLED PROMPTLY through your Ansul Jobber.

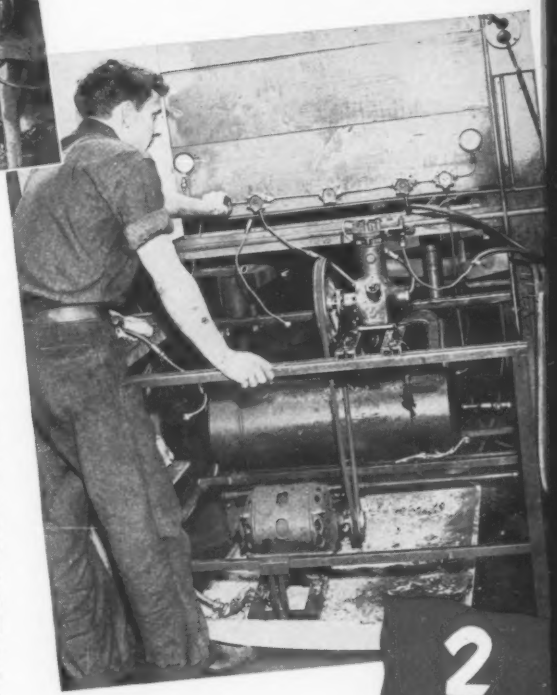
ANSUL CHEMICAL COMPANY
MARINETTE, WISCONSIN

Agents for Kinetic's **"FREON-12"**

*REG. U. S. PAT. OFF. RI-2-44

Shop 2





GENERALLY speaking, the need for a well-equipped refrigeration servicing shop, with its layout planned for the most efficient accomplishment of the many types of jobs that may be brought in for handling, does not occur to the average dealer until he is pretty well along in his business life.

When the dealership is opened, the service department ordinarily is set up on an "exclusive" basis—that is, to handle servicing only for those makes of refrigerators which the dealer sells. As time goes on, the dealer may find that in order to keep his service staff occupied full time, it is necessary for him to expand his operation from an "exclusive" into a "general" one. In doing this general work, many jobs are received that cannot be adequately serviced in the field, and require repair and testing in the shop before being returned to the customer. With a limited equipment which comprised his original servicing set-up, the operator may find himself unable to handle such jobs to his own and the customer's satisfaction.

The advantages of maintaining a well-equipped, well laid-out shop are many, among which the following are probably the most outstanding:

1. There are many items that the customer can bring into the shop to have repaired, eliminating the necessity of sending a service man outside to handle the repair work.

2. Also, items can be observed more closely after being repaired in the shop than if the work were done outside, and if adequate testing equipment is available, can be operated under actual field conditions for a much longer period of time.

3. A large volume of service work can be turned out in the shop by using a comparatively few highly-trained men and a larger number of newcomers to the refrigeration servicing industry, who can perform those jobs requiring lesser skills under the supervision of the skilled mechanics.

Efficient shop layout, important at any time, is doubly important in times like these, when because of the shortage of highly-skilled service men it is necessary to supervise a comparatively large number of inexperienced workers with a few trained men. Under these conditions, the more service operations that are visible to the shop superintendent, the more efficient the supervision over newer workers will be, and the higher will be the quality of the work turned out.

Layout FOR EFFICIENT SERVICING

An "assembly-line" arrangement that will pay its way from both a quality and a quantity standpoint. Part one of a two-part series.

Keeping in mind both efficient shop layout and today's supervisory requirements, benches should be placed in straight lines wherever possible. Also, these should be adequately lighted, and equipped with all required hand service tools, located conveniently to the job being done.

It is desirable to departmentalize the entire shop, wherever possible, so that soldering, cleaning, compressor repair, motor repairs, and testing of repaired equipment can be done at separate locations, since the tools required for these various jobs are different and for the most part can be used only on the operation which they were designed to accomplish. Another important point in this respect is that it is confusing to the newer workers, and retards their development, to have too great a variety of tools at hand when these are not needed for a particular job.

Also, much careful planning is needed to provide some means of removing refrigerant odors from the shop, and in creating clean and desirable working conditions within the shop. As a result of a study made recently of one refrigeration shop designed and operated according to these principles, a description of the departmentalized layout, shop equipment, and repair and testing methods used is presented with the thought that at least some of the ideas used may prove useful to others in this field.

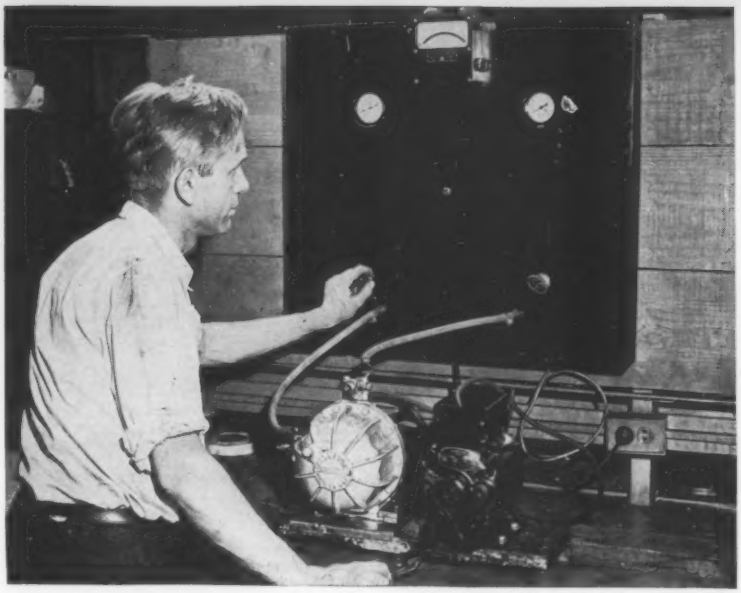
While all of the ideas presented here may not apply to the particular needs of all other individual service shops, they do establish a pattern which can be followed profitably by shops that may be modernizing or perhaps feel that their present equipment or layout is not adequate or being used to the best advantage.

Cleaning Prior to Repair

It is a fact that shop mechanics will do more work better if all items are cleaned before being disassembled for repair. Therefore, it is necessary to have equipment to perform this operation between the receiving department of the shop and the tear-down and assembly bench. Two common methods are available to accomplish this cleaning:

1—The use of petroleum spirits circulated over the work by a small centrifugal pump with a strainer in the suction line to remove large particles of dirt. In addition to circulat-

Figure 4: Rollator test panel and run-in jack.



ing the petroleum spirits over the work, it is desirable to use a stiff brush and buff the work while the spirits are flowing over it. Care should be taken to use a petroleum product that will evaporate readily, leaving the work clean and dry when the operation is completed.

2—A second method is to immerse the work into a hot alkali bath approximately 180° F. This alkali solution will digest the grease, and if the work is slightly agitated, will loosen and remove the dirt. After treatment in this solution the work should be thoroughly flushed with clear water, preferably hot. If cold water is used, it will be necessary to heat the work in an oven to remove all traces of water to prevent rusting. Extreme care should be taken with either of these methods to prevent these solutions from entering refrigerant openings. The work should be carefully capped before subjecting it to this treatment.

Compressor Repair Bench

Figure 1 illustrates a typical compressor repair bench. Note the convenience of the gasket board located over the bench, the tool drawer on either end of the bench, one for each mechanic, also the parts cupboards containing seals and compressor valve parts. An air line is located in the center of the bench and is accessible to either mechanic. This bench is lighted with three 80-watt fluorescent lights and is 20 feet in length. Convenient electric outlets are located 5 feet apart at the back of the bench for use with power tools. An intermediate shelf is located between bench top and floor so that compressor bodies delayed in repair for special parts can be stored away from the area in which the mechanics work. A 5 gallon container is located between the two mechanics for use in disposing of old compressor oil. Each mechanic is responsible for seeing that his section of the bench is cleaned and in good order when he leaves work for the day.

Adjacent to the compressor assembly bench is a compressor run-in jack, illustrated in Figure 2. This run-in jack is adjustable to all size compressors by adjusting slide rails and motor heights. Above the run-in jack are manifold valves which permit the operator to by-pass the suction and discharge gases to draw a vacuum on the compressor, which is indicated on the compound gauge at the left, to pump a pressure, which is indicated on the high pressure gauge at the right of the panel, or to operate the compressor under any set of actual operating conditions. A constant head pressure is maintained in the compressor by pumping into the pressure tank located at the lower rear of the run-in jack. A constant pressure relief valve is installed in the pressure tank and is easily adjustable to any desired head pressure.

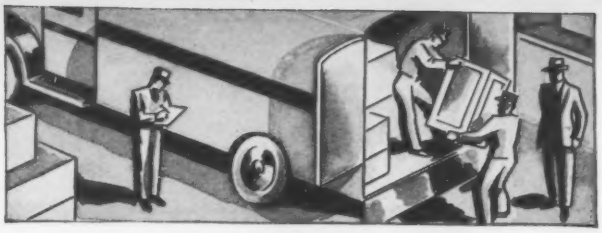
The shop air system is connected through a hand expansion valve to the suction manifold of the compressor, so that any desired suction pressure conditions can be maintained. Under the entire assembly is placed a steel pan filled with an absorbent material which catches any oil spilled or pumped from the compressor, keeping the floor clean and safe for the mechanics using this equipment.

Special Repair, Test and Assembly Bench

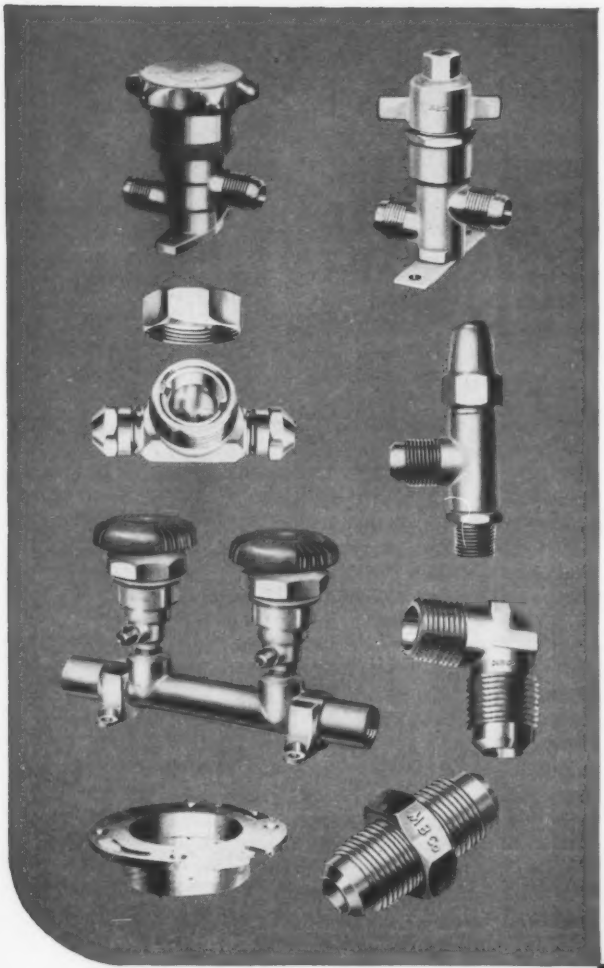
Where a sufficient volume of work of one kind is available in the territory, specialized tools and parts bins can be used to good advantage. Figure 3 is a good example of such an operation. Note the holding jig for the Rollator compressor. A fixture of this sort assures the mechanic that the compressor will be held firmly in the position in which it is most convenient to do the work. The entire assembly can be reversed by merely sliding the compressor out of the slide rails and inverting it. The bench top is covered with highly finished wall board on the area on which the compressors are assembled, so that no dirt may be present without being easily observed. The convenient parts bin at the rear of the bench contains all necessary parts with the part number on each pigeon hole. Using this system, a man quickly becomes familiar with part numbers, which enables him to replace his bench stock of parts by specifying the correct numbers. This procedure saves considerable time in the parts department, as all materials are on the stock shelves by manufacturers' parts numbers. A lapping block is located at the left and to the rear of the operator for use in relapping seal assemblies that are not defective.

Figure 4 illustrates the test panel and run-in jack for the Rollator bench. Here again, the run-in jack is equipped to provide actual operating conditions. The valve on the left is a hand expansion valve controlling suction pressures and the valve on the right is a hand expansion valve controlling the discharge pressure.

At the top center of the test panel is located a watt-meter, which is used in this instance to assure the inspector that the equipment on test is not too tight for field operation. Certain standards have been established for using this watt-meter in connection with testing Rollators, and since its adoption, field returns have been practically nil. Note the quick-clamping type fixture on the run-in jack, eliminating the necessity to bolt each



A REPUTATION FOR SUSTAINED *DELIVERY*



Although war time production and restrictions have necessarily made it very difficult to produce and ship goods to our customers at a rate approximating our peace time rate, we have managed to supply our customers with their essential requirements in reasonable time.

This condition does not prevail through mere chance. When the war broke out we made an extensive study of how we could best serve our customers within existing regulations. This, together with the fact that we are not dependent upon outside sources, but manufacture and control all the parts and operations of our products from the virgin metal to the finished goods, is largely responsible for our favorable position today. WE HAVE A REPUTATION FOR SUSTAINED DELIVERY.

Mueller Brass Co. refrigeration products are in use with our armed forces on practically every front. They are incorporated in units produced by other manufacturers who depend upon us for prompt service and quality products.

Service engineers can place full confidence in Mueller Brass Co. Valves and Fittings. Rigid laboratory control, skilled engineering, highest quality materials, precision workmanship and rigid inspection combine to make our products constantly dependable.

VALVES • FITTINGS • ACCESSORIES FOR REFRIGERATION AND AIR CONDITIONING

MUELLER
BRASS CO.
PORT HURON, MICH.

Figure 5: Assembly and test rack for compressor rebuilds.

piece of test equipment. When satisfactory test results are obtained, this equipment is placed in the oven under vacuum for four hours for the bake-out period. It is then ready for use in the field as a replacement, or for assembly in the shop on a rebuilt chassis.

Figure 5 shows the assembly and test rack for chassis rebuilds. Here again, note the part bins marked with part numbers containing chassis parts, allowing the operator to remain on the job with all materials necessary to complete it within arm's reach. While one chassis is being assembled, the previously built chassis is being run in on the test rack. On this operation a watt-meter is also used and, under specified conditions, a standard reading has been established, and this standard must be attained before the test is completed. All watt-meter readings are checked against name-plate ratings.

Since the above procedure has been established, motor failure in the field on these units has been reduced to a minimum. All units are run in under actual operating conditions, connected to the evaporator at the top of the test panel. Suction and discharge can be determined from gauges located in the test panel and the valves located adjacent to the gauges are suction and discharge shutoff valves. The valve in the center of the test panel is a by-pass valve, which permits the refrigerant in the liquid line to be quickly and completely pumped down and balanced so odors do not escape into the shop and air is not admitted to the system. The lower shutoff valve is connected to the vacuum line which is used to discharge each new assembly connected to this test rack. Adjacent to the chassis on the end of the bench is a refrigerant drum used for charging. It is placed on a 250-watt heating element which the operator can use to hasten the charging operation.

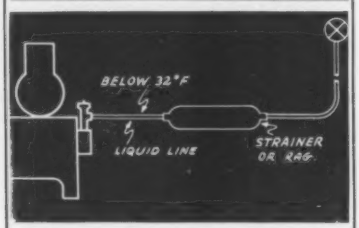
The electrical connections to the motor are made by rubber insulated clamp-on connectors, which reduces time in assembling the chassis on the run-in rack. Here again, note that the tool drawer is located conveniently in front of the mechanic so he can replace his tools when necessary.

(A second article, in the August issue of The Refrigeration Industry, will cover degreasing and spraying equipment, refrigerant charging apparatus, and moto rrepair equipment.)

GAGE BLOCKS ON 'FREE' LIST

GAGE blocks, production and inspection gages and tool room specialties have been eliminated from General Preference Order E-5-a, since deliveries are now being made on a basis almost current with orders. Sales of these items are now without restrictions. Order E-5-a retains control over micrometers and various types of measuring tools, however, with an AA-5 or higher required at the producer level. Only purchase orders with ratings assigned on WPB-547 (PD-1X), WPB-646, or Canadian form PB-1010 can qualify as "stock orders", for which 20-25% of monthly production is being set aside.

I do it this way...



WHEN using methyl chloride or F-12 and up, if there is a suspicion of moisture, it can be removed easily without the use of anything beyond the usual equipment at hand.

When I get on this type of job I heat the valve. If the flow starts I know it's moisture. Therefore, if ice forms there, make it form elsewhere and trap it. This may be accomplished by any type of strainer. Even a rag, inserted in the liquid line, can help. But, of course, the bigger expansion surface, such as a dehydrator housing, is better.

After this evaporator is improvised all you do is shut the liquid line valve down until you have the point of expansion just inside of the point where the strainer is. The moisture will be collected at this point and can be removed after a while in the form of ice.

Chas. H. Doyle, Brooklyn, N. Y.

HOW DO YOU DO IT?

Do you have a simpler way—faster way—to do a job?

THE REFRIGERATION INDUSTRY pays $5.00 for each hint or kink published. Send them in—a simple drawing or photo helps the description.

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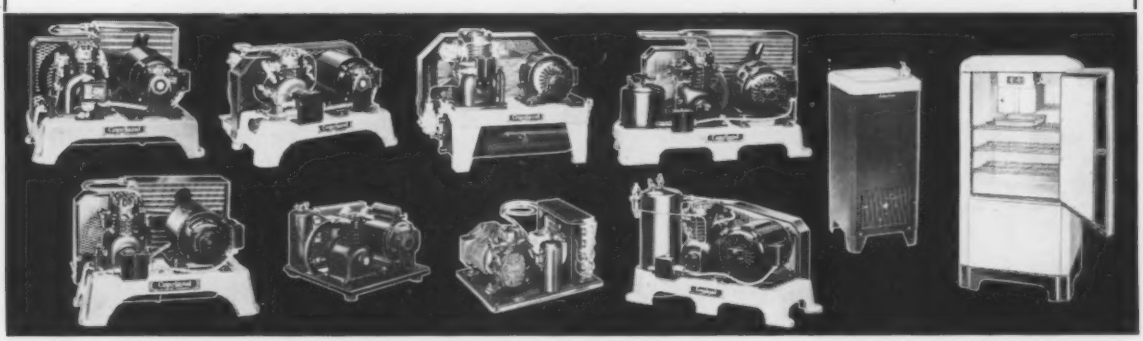
...Calls on You

To remember this COMPLETE line in your planning

- Open Type Commercial Condensing Units
- Copelametics (Field-Serviceable Hermetics)
- Electric Water Coolers
- Household Electric Refrigerators
- Refrigerator Replacement Units



COPELAND REFRIGERATION CORPORATION, Sidney, Ohio, U. S. A.

ELECTRIMATIC REGULATING VALVES

•

Automatic control and regulating valves for Freon, Methyl Chloride and Ammonia. A large variety of sizes and types available for practically any refrigeration requirement.

WL water regulating valves for Freon, Methyl, or Sulphur. 5/16" orifice and 3/8" FPT. Brass body construction. Large capacity—no chatter.

WP water regulating valves are available in 3/8", 1/2" and 3/4" FPT sizes. Brass body construction for Freon, Methyl or Sulphur. Easy adjustment.

WK water regulating valves are De Luxe Pilot Operated Modulating valves. Iron body, simple adjustment. Available in sizes ranging from 3/4" to 2" FPT.

WR regulating valves for Ammonia are diaphragm operated and highest quality corrosion resistant materials are used. Available in sizes ranging from 3/8" to 2" FPT.

Electrimatic valves are individually tested for efficient, economical operation. Trouble free performance.

•

Ask for a copy of our latest catalog today.

Electrimatic

2100 INDIANA AVENUE

CHICAGO 16, ILL.

B. D. BERK

B. D. Berk has been appointed zone manager for Lynch Mfg. Corp. covering eight Midwestern states, with headquarters in Chicago. Mr. Berk

Mr. Berk

joins Lynch after 18 years' experience in specialty distribution through automotive and specialty jobbers.

H. M. IVERSON

Harry M. Iverson has been appointed comptroller of Carrier Corp., succeeding F. F. Hoyt, vice president, who formerly also served as comptroller and has now been designated chief financial officer of the organization. Mr. Iverson formerly was associated with Arthur Andersen & Co., New York City.

R. L. ERWIN

R. L. Irvin has been appointed application manager of the small motor division of Westinghouse Electric and Manufacturing Co., Lima, Ohio. He was formerly industrial manager of the company's northwestern district with headquarters in Chicago.

J. H. ASHBAUGH

John H. Ashbaugh, manager of the Westinghouse Electric Appliance Division in Mansfield, Ohio, is one of four new vice presidents recently elected by Westinghouse Electric & Mfg. Co.

Mr. Ashhbaugh started with Westinghouse as a student engineer, and in 1931 was transferred to the company's Electric Appliance Division as assistant manager of engineering at Springfield, Mass. Less than a year later he was named manager of engineering at that plant.

RALPH C. CAMERON

Ralph C. Cameron has been appointed director of merchandising for Airtemp Division, Chrysler Corp. He will continue to direct postwar planning activities of the company.

V. P. Black will continue as advertising manager, W. H. Knowlton, sales promotion manager, and Paul H. Dow will be in charge of sales training.

Mr. Cameron came to Airtemp early in 1942 from Nash-Kelvinator Corp., where he was sales manager

Mr. Cameron

of the household division. Previously he was assistant manager of the specialty appliance department of General Electric Co. A post-graduate in the school of specialty selling, Mr. Cameron has been a retail salesman, wholesale man, and manager of distributing organizations.

W. MARSH, L. E. WETZEL

William Marsh and L. E. Wetzel head the branches which have recently been opened in Boston and Cleveland, respectively, by General Con-

trols Co., Glendale, Calif., manufacturer.

A native New Englander with 20 years' experience in the automatic controls field, Mr. Marsh as manager of the Boston branch will be located at 687 Boylston St.

Mr. Wetzel, heading the Cleveland branch at 1505 Broadway, is a graduate of Purdue University and John Huntington Institute Technical College.

JAMES PURVIS

James Purvis, formerly with the firm of Giffels and Valet, Detroit, has been named plant superintendent and assistant works manager of Universal Cooler Corp., Marion, Ohio.

FRAN F. HOUSE

Fran F. House has been transferred from the home office of Mueller Brass Co., Port Huron, Mich., to the company's branch office in Philadelphia.

PAUL A. TILLEY

Paul A. Tilley has been appointed manager of the appliance distributing branches of General Electric Co., which are now located in Boston, Newark, New York City, Philadelphia, Tampa, Cincinnati, St. Louis, and Los Angeles. Mr. Tilley will headquarter in Bridgeport, Conn., where since 1938 he has been manager of distribution services for G-E.

WARD R. SCHAFER

Ward R. Schafer has been appointed western regional sales manager for Edison General Electric Appliance Co., Inc., with headquarters in San Francisco and supervision over the Salt Lake City, Los Angeles, and Seattle districts.

L. G. HUGGINS, W. C. GOODWIN, H. A. BLAIR

Appointment of three men to executive positions on his staff has been announced by Ross Rathbun, manager of air conditioning at Westinghouse Electric Elevator Co., Jersey City.

L. Gale Huggins was named assistant manager of air conditioning and will be general assistant to Mr. Rathbun in administration, engineering, and application matters; Walter C. Goodwin becomes negotiation manager with responsibility for application engineering and negotiations; and Howard A. Blair was appointed service manager.

E. R. LEGG, T. A. FARRELL, D. A. PACKARD

Three assistant general sales managers of the Kelvinator appliance division of Nash-Kelvinator Corp. have been appointed by Charles T. Lawson, vice president.

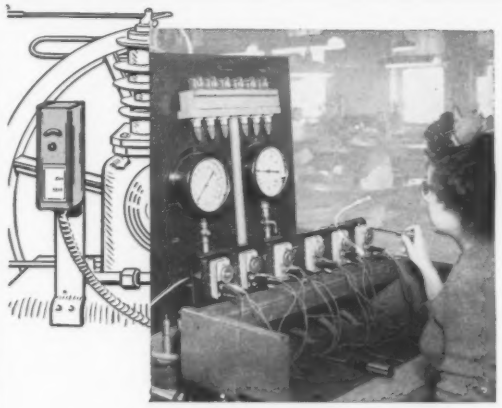
E. R. Legg will be in charge of the commercial and contract division. He has been with Kelvinator since 1927, and most recently has been developing a post-war program for the products of his new division.

T. A. Farrell will be in charge of operations, including supervision of Eastern, Western, and Pacific Coast regional managers as well as business operations in the home office. With Kelvinator since 1929, he formerly was manager of the commercial, parts and service division.

D. A. Packard will be directly responsible for sales and merchandising activities on all Kelvinator household products. He has been with the company since 1940, and most recently was eastern sales manager.

ACRMA OFFICERS

D. W. Russell, president of Airtemp Division, Chrysler Corp., has



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IS WHERE YOU GET YOUR MONEY'S WORTH OF SKILL!

8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action Principle incorporating solid-liquid filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.

One of the most important steps in the manufacture of White-Rodgers Controls is the final step— the thorough testing of each control upon completion. Ingenious testing apparatus, designed by the men who developed the controls and know the requirements they must meet, qualifies the performance promises made on our products

One of these tests is illustrated above — pressure controls being tested for accurate calibration and positive contact action — determining factors in the life and accurate performance of the control.

That is why— when you specify White-Rodgers Controls for your equipment — you know that they will give the dependable and accurate service so necessary to assure the dependability of *your* product.

WHITE-RODGERS ELECTRIC CO.

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Controls for Refrigeration • Heating • Air-Conditioning

Why the Trend Is Strong to CHICAGO SEALS and VALVE PLATES

CHICAGO GENERAL REPLACEMENT SEAL

ONE OF CHICAGO'S VALVE PLATES

Chicago Seals and Valve Plates make a better servicing job on all refrigerators, in less time, at less cost, at more profit... and more service men and more jobbers are finding out this fact every day.

CHICAGO SEAL CO.

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CHECK DOOR GASKETS ON EVERY JOB!

Make a habit of checking door gaskets on every refrigerator you repair... you'll earn more money and do a better service job. Worn or deteriorated gaskets cause heat losses ranging up to 9% on a high percentage of used refrigerators, and cost the owners money.

Jarrow Gaskets for all popular makes of refrigerators conform to original specifications ...are recognized as the ideal gaskets for replacement.

Your Jobber Has Jarrows In Stock

JARROW PRODUCTS

420 N. LA SALLE ST., CHICAGO 10, ILLINOIS

been elected president of the Air Conditioning & Refrigerating Machinery Association, Inc. for the coming year.

Other officers are: S. E. Lauer, York Corp., first vice president; F. S. McNeal, Universal Cooler Corp., second vice president; and P. A. McKittrick, Parks-Cramer Co., treasurer. C. E. Wilson, Worthington Pump & Machinery Corp., was named chairman of the board of directors.

K. L. WILSON, C. LOCKE

Appointment of two new branch managers and two supervisors has been announced by Minneapolis-Honeywell Regulator Co. Kentner L. Wilson, formerly industrial manager of the Cleveland office, has been named manager of the Detroit district, and Charles Locke, formerly branch manager at Albany, becomes branch manager of the Indianapolis office.

D. J. Peterson, formerly manager at Detroit, has been appointed zone original equipment supervisor in Cleveland. Edward Clucas has been placed in charge of M-H's Modutrol activities in the Indianapolis area.

DRIVE-IN WAREHOUSE

Cutler-Hammer, Inc. has opened a drive-in warehouse at 1200 Walnut St., Cincinnati. At present Cutler-Hammer maintains a district sales office at Central Parkway and Walnut St. Both the district office and the new drive-in warehouse will be under the management of E. C. Bolton. A complete stock of C-H electrical controllers will be carried at the drive-in warehouse.

SEEGER TO PRODUCE POST-WAR "FREEZER"

Walter G. Seeger, president of Seeger Refrigerator Co., St. Paul, Minn., has announced that the company will offer to the consumer field a streamlined "freezing cabinet" for post-war use, in addition to the line of commercial refrigerators which Seeger has been manufacturing for almost half-a-century.

Mr. Seeger said that the company had made an extensive survey as to the type of "freezing cabinet" the housewife will want and need following the war. The most popular demand is for the 6 cubic-foot cabinet, he said.

One of the features of the Seeger cabinet will be three pull-out drawers, two for freezing and storing foods and one for storage only. Several models will also be available.

An advertising and merchandising campaign will be started this summer to acquaint the public and dealers with the features of the new line. Consumer magazines and trade papers will be used.

REFRIGERATION FOR FISH PROCESSING

Refrigeration equipment valued at $331,624 for use in fishing vessels and shore processing plants was approved by the War Production Board on recommendation of the Office of the Coordinator of Fisheries during the twelve-month period ended March 31, 1944.

Included in the refrigeration total were compressors valued at $52,489, condensers worth $5,187 and general refrigeration equipment valued at $273,948. Motors and generators valued at $44,668 also were used.

CHANGE IN ALLOY STEEL TUBING REGULATION

Users of alloy steel tubing, other than engine or airframe tubing, can accept larger deliveries of this material under a change in Controlled Materials Plan Regulation No. 2 announced by WPB. The change, made in Direction 16 to the regulation, allows eligible users to accept deliveries of the following amounts, even though their resulting inventories may be more than their requirements for the following 60 days:

Tubing up to and including 7½ inches O.D.: 5 tons of a given size or a minimum mill production run.

Tubing over 7½ inches O.D.: 10 tons of a given size or a minimum mill production run.

Users who receive such deliveries, however, are not eligible for further deliveries of the same item of tubing until their inventories are again within the 60-day limit.

FEDERAL EXCISE TAX

Dealers, contractors, and others doing business with the Federal government are reminded that the exemption from federal excise tax on such sales does not apply to sales made or contracts dated after June 1 of this year, according to the provisions of the 1943 Revenue Act.

Refrigerant Control at Sub-Zero Temperatures

Here's a possible solution to a definite need, largely developed during the war period.

By F. Y. Carter
Detroit Lubricator Co.

DEVELOPMENTS in the extreme low temperature field of refrigeration have come with such speed that sufficient time for basic research into refrigeration controls for this field did not exist. Consequently, it was necessary to adapt existing equipment to meet the urgency of the situation.

A study of the characteristics of standard expansion valves at temperatures as low as —120°F. revealed that with minor changes in construction and cross-changed power elements passable valve performance could be obtained, provided the systems on which they were to be used were reasonably well engineered and free from dirt and moisture.

The most important result of this study was to drive home the fact that basic research into the control problem was necessary to overcome the lack of pressure with which to operate the valve mechanism at extremely low temperatures. Subsequent research brought about the development of differential temperature expansion valves. The comparisons of such valves to standard thermostatic expansion valves are shown in the following.

First, let us see what is involved in applying a standard thermostatic expansion valve to a low temperature application.

Thermostatic expansion valves depend for their operation on varying pressure conditions. Expansion valves are designed so that during normal operation the temperature of the feeler bulb and the corresponding pressure developed within the power element is balanced by the suction pressure plus an adjustable spring force. By making up the difference with the adjustable spring force, it is possible to have the saturation temperature of the power element pressure a few degrees higher than the saturation temperature corresponding to the valve suction pressure, and this difference of temperature is designated as "bulb superheat."

It is customary to adjust expansion valves at the factory so that the needle of the expansion valve will be just barely closed when the valve is adjusted for the superheat setting. The superheat thus measured at the factory with the needle in the closed position is generally referred to as the "static superheat" or "factory setting."

The capacity which an expansion valve will deliver is directly related to the opening of the valve needle. The "control mechanism" or "movable part" of an expansion valve, which includes the power element, the suction pressure element, the needle, and any springs, can be considered as one large spring having an average spring scale or valve modulus. When the expansion valve needle is just closed it is found that the force exerted by the power element is exactly balanced by the force exerted by the suction pressure element plus the adjusting spring.

Capacity and Temperature

If the power element pressure is increased slightly, this being accomplished by increasing the feeler bulb temperature while holding the suction pressure constant, it is found that the valve needle opens a definite amount for each degree rise in feeler bulb temperature. Inasmuch as the capacity of the valve is directly related to the valve needle opening, it follows that the capacity can also be related to an increase in the feeler bulb temperature.

By reference to the pressure-temperature characteristic curve of Freon-12 it is found that at air conditioning temperatures 3° F. change in bulb temperature causes a pressure change in the power element of 3 lbs. per sq. in. This change in pressure will cause the expansion valve needle to open up to a rated position. Referring to the curve at—100°F. it is found that a 33° F. change in bulb temperature will be necessary to create 3 lbs. pressure difference and cause the expansion valve needle to open to the rated position selected above. Obviously an attempt to operate at this extremely high opening super-heat would result in a badly starved evaporator.

To prevent such an operating condition it is necessary that the expansion valve be selected so that the needle will open enough to deliver the desired capacity with a small opening superheat, this allowing the evaporator to be fully refrigerated. Also, by selecting a small opening superheat the expansion valve can move from the demand position to the closed position very quickly, this being especially desirable in the cases of flood over. If the expansion valve is to operate at low temperatures with the same 3° F. change in bulb temperature selected for air conditioning operation, reference to the pressure-temperature characteristic curve will show that the pressure change developed within the power element will be approximately 2/10 lb. per sq. in., or approximately 1/15 the pressure change which occurred at air conditioning temperatures.

Literally this means that at —100° F. suction temperature the needle valve will be open approximately 1/15 the opening developed

at air conditioning temperatures. Inasmuch as the needle opening is greatly restricted under the low temperature operating condition it will be necessary to increase the orifice size to make up the difference if the same capacity is desired. Practically this means that a very large conventional type thermostatic expansion valve must be selected for a comparatively small capacity low temperature application.

Advantages and Disadvantages

The advantage of such a valve selection is its close superheat control. It has the disadvantage of a very large orifice with the accompanying surge, and the needle working close to the seat with the added possibility of clogging due to dirt and moisture. Also, the power element charge must be selected to suit the refrigerant in the system, inasmuch as the system suction pressure furnishes the motive force for one of the valve elements. Due to characteristics of the commonly used refrigerants at low temperatures there is such a small pressure change for any reasonable temperature change that insufficient power may be available to move the valve mechanism the desired distance. This difficulty will exist in any thermostatic expansion valve on common low temperature applications using the suction pressure as a motive force.

A Differential Temperature Expansion Valve can be designed to operate by temperature only, thus eliminating the suction pressure as a motive force. (Figure 1) Should a pressure type distributor be used the evaporator bulb should be connected beyond a feed tube close to the evaporator.

The valve (Figure 2) has two opposed power elements; the evaporator power element, the feeler bulb of which clamps to the valve outlet feed line and in effect feels the suction pressure, and the superheat power element, the feeler bulb of which clamps to the suction line at the evaporator outlet in the same manner as the feeder bulb on the conventional thermostatic expansion valve. The difference in temperature between these two bulb locations (superheat) governs the flow of refrigerant through the valve to keep the evaporator fully refrigerated during compressor operation. The superheat is set at the factory at 8 to 10°, but this adjustment can be changed in the field if necessary.

Figure 1. The proper method of hooking up a Differential Temperature Expansion Valve.

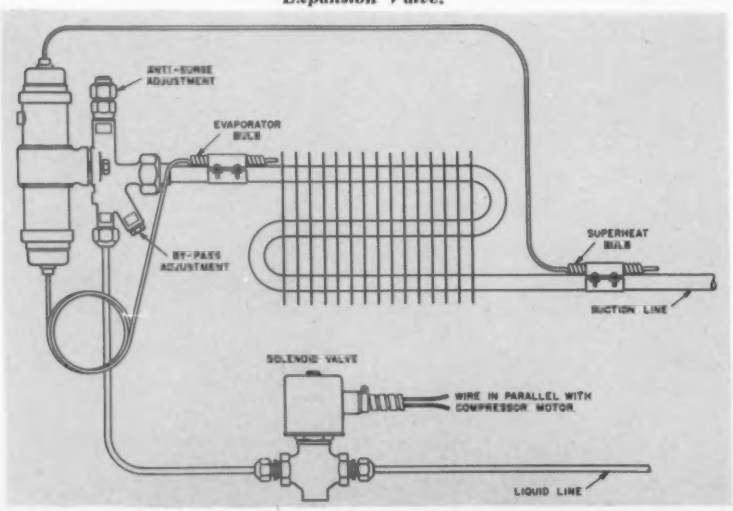
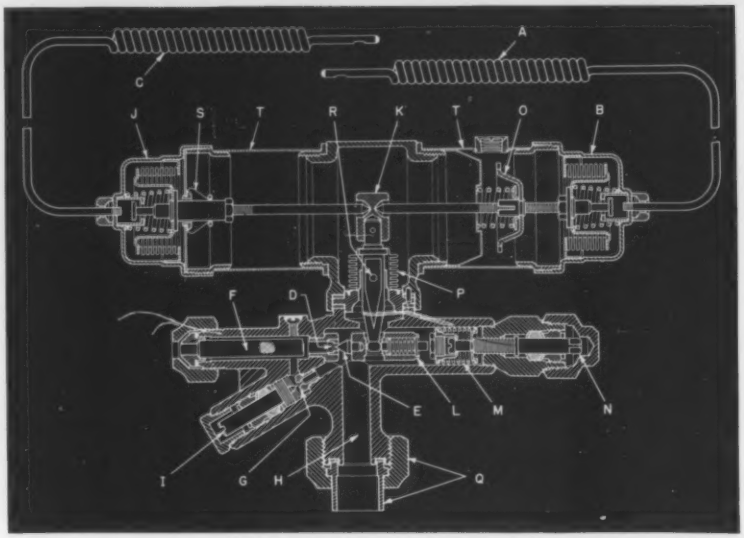


Figure 2. A cross-section view of a Differential Temperature Expansion Valve with a description of the various parts.



A, Superheat Bulb; B, Superheat Power Element; C, Evaporator Bulb; D, Main Valve Orifice; E, Main Valve Needle; F, Strainer; G, By-pass Valve Orifice; H. Outlet Passage; I, By-pass Valve Adjustment; J, Evaporator Power Element; K, Operating Lever; L, Needle Carrier Assembly; M, Anti-surge Spring; N, Anti-surge Adjustment; O, Superheat Adjustment; P, Sealing Bellows; Q, Forged Union Connection; R, Operating Lever Fulcrum; S, Anti-chatter Device; T, Stainless Steel Spacer.

Operating Characteristics

The valve will operate with approximately a 10° differential temperature (superheat) at any saturation suction temperature below —15 to —30° F. as adjusted at the factory.

Inasmuch as the valve maintains the operating temperature differential approximately constant at 10° F. regardless of the charge sealed in the power elements, it is possible to select a charging fluid which will give large pressure changes with small bulb temperature changes for low temperature work. Also, inasmuch as the suction pressure does not affect valve operation, the same valve can be used on any refrigerant. A conventional thermostatic expansion valve used at air conditioning temperatures would have a full rated needle opening with a 3° F. feeler

bulb change. By charging the elements of the valve with a very high pressure refrigerant approximately the same needle opening is obtained with a 30° F. feeler bulb change at —100° F. suction temperature. Thus the advantage of the small orifice with the large needle opening is obtained at the very low temperatures. This not only gives smooth metering of the refrigerant but also allows relatively high expansion valve capacity ratings.

It was explained above that the main valve needle would open when the temperature of the superheat bulb became 10° F. higher than the temperature of the evaporator bulb, or when the difference in temperature between the two feeler bulbs was equal to the superheat setting. When the temperature difference between the two bulbs is less than 10°, or the superheat setting, the main needle will remain closed. During a shut-down period both bulbs assume the same temperature and the valve remains closed unless some means is employed to cool the evaporator bulb at the start of the running period. This is accomplished by an integral by-pass metering valve which continually feeds a small amount of refrigerant to the evaporator during the running cycle so that the evaporator bulb will always be colder than the superheat bulb.

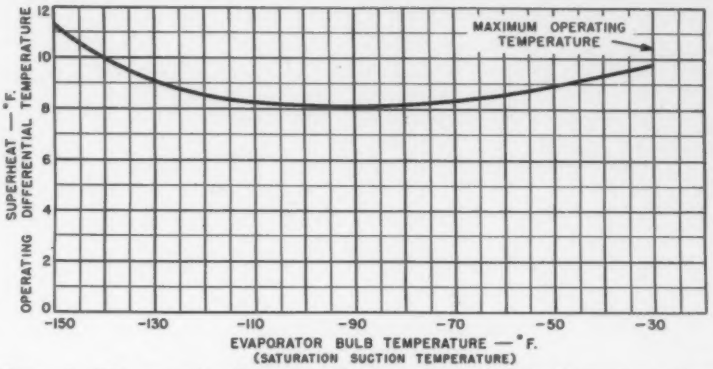


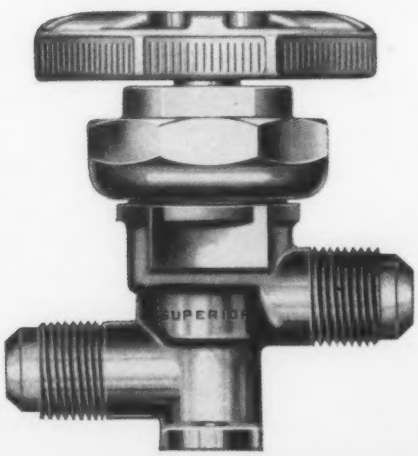
Figure 3. The operating differential between the two feeler bulbs for various suction temperatures.

This by-pass metering valve is always open, and as a result refrigerant will continue to by-pass the main needle during the off cycle unless means are taken to stop the flow of refrigerant to the valve. This requires a solenoid valve in the main liquid line, wired in parallel with the motor, in order to stop the flow of refrigerant during the off cycle.

Both power elements are gas charged so that the main valve orifice will remain closed at all temperatures above a maximum saturation temperature of —15 to —30° F. (even though the by-pass is open and cooling the evaporator bulb). The gas charging principle helps to eliminate an unbalanced condition in the system, and the possibility of flooding over due to excess compressor capacity during the pull-down period. This prevents overload during the pull-down period and makes it possible to select motors more nearly rated to the job, espe-

Check These Features!

Superior Diaphragm Packless Valves



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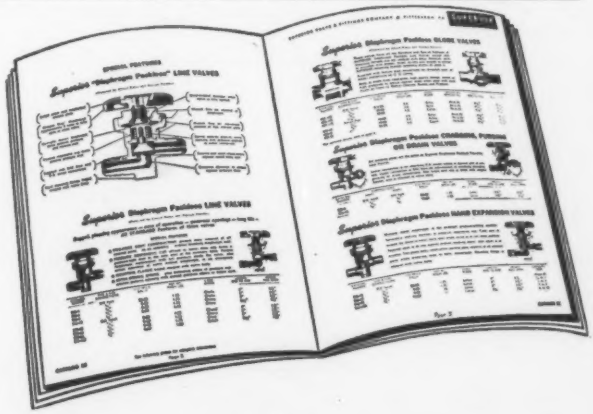


The only diaphragm packless valve with the internal assembly removable as one complete unit . . . a valuable feature when it comes to soldering lines to the valve connections. No need to break the diaphragm seal . . . simply remove the internal assembly *as a unit* . . . solder the connections . . . and replace the assembly. No fuss . . . no bother . . . no special tools . . . and above all, no damage to vital parts. What could be simpler!

But that's not the only important feature of these SUPERIOR DIAPHRAGM PACKLESS VALVES! Pressure responsive cup forms positive pressure-tight seal . . . permitting replacement of the diaphragm with full pressure in the valve . . . or even actual operation of the valve *without the diaphragm* . . . in an emergency.

Rugged, pleasing appearance—ease of operation—generous openings—extra long life—all these are standard features of the valve.

If you haven't a copy of Catalog R2, request one today.

SUPERIOR VALVE & FITTINGS COMPANY

PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES...WEST COAST STOCK, LOS ANGELES (15) JOBBERS EVERYWHERE

cially on jobs where a quick pull-down is not essential. On jobs where the pull-down is *vital* a standard single diaphragm thermostatic expansion valve of the correct rating for the higher operating condition can be employed in parallel. In this type of hook-up the single diaphragm expansion valve will have attained a high enough static superheat to remain closed once the differential temperature expansion comes into operation.

Temperature swing and pressure surge often occur, and in an effort to eliminate these undesirable occurrences the valve has been equipped with an anti-surge device which consists of a mechanical stop by which the normal operating opening of the main needle can be limited. This stop has built into it a collapsible spring set for an initial force approximately equal to 10° superheat. When the compressor capacity is much greater than normal, as during a pull-down period, the normal operating opening of the main needle is insufficient to pass the demand flow and the evaporator starves. The superheat bulb begins to warm up and when the superheat (difference in temperature of the two bulbs) reaches a value 10° higher than the normal operating superheat the anti-surge spring collapses and allows the needle to open wider. Thus, during the pull-down period the valve compensates for possibility of flood over by automatically increasing the operating differential of the two bulbs (superheat). When the pull-down has been completed the normal operating opening of the needle is sufficient and the operating differential automatically returns to the initial value of 10°, or whatever it may be.

Valve Operation Reviewed

Referring again to Figures 1 and 2, the operation of the valve is as follows. When the compressor motor starts, the solenoid valve in the liquid line opens simultaneously and refrigerant flows through strainer "F" through by-pass valve "G" and through outlet channel "H" to the evaporator. (The main needle "E" still remains seated in orifice "D.") As the compressor continues to run, the small amount of refrigerant flowing through the by-pass valve "G" cools the feeler bulb "C" which is clamped to the evaporator inlet. When the compressor has reduced the saturation temperature at the evaporator bulb "C" location to —15° to —30° F., the vapor pressure in the evaporator bulb is reduced, allowing the vapor pressure in the superheat bulb "A" to overcome the force exerted by the evaporator bulb, and the difference between these two forces results in opening the main valve needle through operating lever "K", which is fulcrumed at "R". The amount of needle opening is proportional to the difference between the forces exerted by power elements "A" and "C". During normal low temperature operation, the difference in temperature between the two bulbs is maintained at 8-10° (superheat).

NEW PLAN FOR HIRING AFTER JULY 1

A new program governing the hiring of all male employees is scheduled to be put into effect on a nation-wide basis through War Manpower Commission and United States Employment Service. The deadline nationally was scheduled for July 1, although programs could be put into effect in any area at an earlier date, if desired.

Purpose of the new regulations is to accomplish a better control of workers in labor-shortage areas, to keep workers on jobs where they are needed most, and to channel more workers into the more essential jobs. A "priority referral schedule" will be set up for each area, and workers will be assigned first to those establishments having the highest priority rating.

"E" AWARD TO ALCO

In recognition of "outstanding achievement in war production," Alco Valve Co. recently was awarded the Army-Navy "E" citation in a ceremony in the Ward Junior High School auditorium, St. Louis. The program was broadcast by radio station KWK. In presenting the "E" flag, Rear Adm. Wat T. Cluverius, USN (Ret.), told Alco employes that "the work of your hands is a part of the equipment of every ship of the Fleet—on the surface, beneath the sea and in the air." Accepting the award, A. B. Schellenberg, Alco president, recalled that the company had started production of war materials long before Pearl Harbor.

VIRGINIA REFRIGERANTS

-"SULFUR"
-"METHYL"
-"METHYLENE"

Tested Purity for Service Surety

AGENTS FOR KINETIC'S
"FREON-12" and "FREON-22"
VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA

EX-SERVICEMEN FOR SERVICE

Here's a ready-made market for refrigeration repairmen—the veterans of World War II. The veterans employment service headquarters in your state can furnish the "Prospect List."

THE availability of honorably discharged members of the U. S. armed services as trainees for refrigeration repair work is emphasized by the National Refrigeration Service Council in a recent bulletin. Approximately 80,000 war veterans are being discharged each month, the bulletin points out, and the U. S. Employment Service naturally gives preference in placing these men in jobs.

Some of these men will have had training in one of the government refrigeration training schools, or will have acquired other mechanical skills as a result of army training. Any good mechanic can be trained to work on refrigeration equipment, so this source of manpower should not be overlooked, the bulletin says.

In many areas the Veteran's Employment Service has representatives, who are anxious to fit returning veterans into jobs best suited to their qualifications, and into an industry where future growth and expansion is contemplated. The refrigeration industry qualifies in both these respects.

Following is a state-by-state list of Veterans' Employment Service representatives:

Alabama: S. E. Greene, 1800 First Ave., N., Birmingham 3.

Arizona: Glenn A. Snodgrass, 818 Security Building, Phoenix.

Arkansas: John A. Pearman, Old Post Office Building (Box 2019), Little Rock.

California: Urban F. Stewart, 401-02 Sharon Bldg., 55 New Montgomery St., San Francisco 5; Herbert Schierenbeck, 1100 South Flower St., Los Angeles 15.

Colorado: R. Dale Mickle, 470 State Capitol Annex, Denver 2.

Connecticut: Arthur V. Geary, 122 Washington St., Hartford 6.

Delaware: John P. Benson, 601 Shipley St., Wilmington.

District of Columbia: Howard S. Fisk, 1022 Fifteenth St., N. W., Washington 25.

Florida: Ralph E. Macdonald, 201 City Office Bldg., Tallahassee.

Georgia: J. P. Kelly, 86½ Luckie St., (Box 1276) N. W., Atlanta 1.

Idaho: Terry Prater, 159 South Eighth St. (Box 877) Boise.

Illinois: H. H. Weimer, Walter E. Ernst, Room 300, 222 W. North Bank Drive, Chicago 54.

Indiana: Melville W. Hankins, 141 South Meridian St., Indianapolis.

Iowa: John H. Quigley, 419 Federal Office Bldg., Des Moines.

Kansas: A. Ross Neville, 439 New England Bldg., Topeka.

Kentucky: H. H. Jeffries, 520 Federal Bldg., Louisville.

Louisiana: Louis W. Dawson, 127 Elk Place, New Orleans 13.

Maine: Francis J. McDonnell, 76 Pearl St., Portland 3.

Maryland: A. Vernon Collison, 935 O'Sullivan Bldg., Baltimore 2.

Massachusetts: Irving J. Loucraft, 881 Commonwealth Ave., Boston.

Michigan: Russell D. Holmes, 1164 Penobscot Bldg., Detroit 26.

Minnesota: Stuart V. Russell, 369 Cedar St., St. Paul 1.

Mississippi: L. W. Brandon, 207 Johnson-Spengler Bldg., Jackson.

Missouri: Theodore Marks, 310 East Capitol Ave., Jefferson City.

Montana: R. B. Downs, 322 Fuller Ave., (Box 953), Helena.

Nebraska: W. H. Andresen, 1220 N St., (Box 1033), Lincoln 8.

Nevada: Harry Z. Guerin, Bradley Bldg. (Box 2349), Reno.

New Hampshire: Damis Bouchard, 34 South Main St., Concord

New Jersey: Thornton Webster, Room 222, Hunt Bldg., 219 East Hanover St., Trenton.

New Mexico: James A. Tadlock, Veterans' Employment Representative, 111 South Sixth Street (Box 1492) Albuquerque.

New York: F. G. Newcomer, George W. Carpenter, 28th Floor, 11 W. 42nd St., New York 18.

North Carolina: Ruffin C. Godwin, Caswell Bldg., Raleigh.

North Dakota: Ed Kibler, Box 1242, Federal Bldg., Fargo.

Ohio: Orin Schmitz, 427 Cleveland Avenue, Columbus 16.

Oklahoma: Guy C. Knarr, 612 American National Bldg., Oklahoma City 2.

Oregon: J. Richard Smurthwaite, Jr., Room 204, Pioneer Post Office Bldg., Portland 4.

Pennsylvania: William O. Ilgenfritz, 1835 North Third St., Harrisburg.

Rhode Island: John F. Radikin, 901 Union Trust Bldg., Providence.

South Carolina: Felix W. Goudelock, Room 1008, Palmetto Bldg., (Box 1227), Columbia.

South Dakota: Louverne J. Ballou, 422½ South Main St., Aberdeen.

Tennessee: Clark E. Sloan, 413 Cotton States Bldg., Nashville 3.

Texas: Thomas L. Ward, Thomas D. Kimbro, 208 Brown Bldg. (Box 957), Austin.

Utah: J. Harry Hickman, 1201 Continental Bank Bldg., Salt Lake City.

Vermont: John H. Phalen, 14 Cottage St., Rutland.

Virginia: E. Clyde Smoot, 311 Broad-Grace Arcade, Richmond 19.

Washington: James C. Grant, 201 Ranke Bldg., Seattle 1.

West Virginia: Charles L. Rolfe, 510 Chamber of Commerce Bldg., Charleston 1.

Wisconsin: William H. Siemering, Room 1105, State Office Bldg., One West Wilson St., Madison.

Wyoming: James F. Hook, 200 North Wolcott St., Casper.

Trainees at work in Cleveland's first wartime refrigeration school.

Cleveland's Newest Service Men

TRAINEES in the first class in refrigeration servicing work sponsored by the Refrigeration Service Council of Cleveland have completed the household refrigeration course of study are now actively engaged in helping to keep the city's domestic equipment running. Classes have been suspended during the summer months, but will resume this fall, with commercial refrigeration scheduled as the next phase of study.

Out of 50 enrollees, 35 persons completed the initial part of the course. The original class was comprised of 30 newcomers to the industry, recruited from more than 100 referrals received from U. S. Employment Service, with the other 20 students already employed as apprentice mechanics by Refrigeration Service Council members.

All but five of the 30 new men followed the household course through to completion. The rest of the dropouts were among experienced men already employed, who found the load of daytime servicing and nighttime classes too heavy as the repair season approached. When the classes were started in February, the average work-week among refrigeration service men in the Cleveland area was 56 hours—with the season in full swing, the work-week now averages something over 70 hours.

In assembling the class members, each member of the Refrigeration Service Council was permitted to enroll at least one member—or prospective member—of his organization, with the balance apportioned according to servicing volume of the employer. One firm had five trainees in the course, the largest single number represented.

One requirement for acceptance in the class was that the prospective student be deferred or draft-exempt; another stipulation was that no trainees would be accepted for postwar work only, and that training would be confined to men who would do actual work for service contractors. This barred manufacturers' maintenance men.

Instructors in the course were Vincent Flowers, of the Kane Furniture Co., and J. H. Downs, of Refrigeration Supplies Co. The lecture and demonstration method of training was used, with trainees getting most of their experience on actual shop jobs. Classes were held at night in the Cleveland Trade School, space being provided by the Board of Education.

DALLAS SERVICE SCHOOL "GRADUATES" 11 MEN

"Graduates" of the class in refrigeration service training conducted by the Dallas Refrigeration Service Council received certificates of recognition at a dinner and commencement program, reports J. H. Apperson of Texas Power & Light Co., chairman of the local council.

Of the 12 men originally enrolled, 11 completed the course and are now doing refrigeration service work for employers who paid them a wage

while they attended the school, which was held in the daytime. The men had no previous experience in refrigeration repair, and constitute a valuable addition to the limited force of refrigeration mechanics in the Dallas area. Quarters and facilities of the Dallas War School, vocational training center, were used in conducting the course.

Plans are now under way for additional classes, Mr. Apperson says, probably a night class for beginners and another for up-grading present repair men. Chief stumbling block is in finding capable instructors with sufficient extra time in which to do this work.

WPB RULES ON DESERT COOLERS

Manufacture of certain types of evaporative (or "desert") coolers has been authorized by WPB through the issuance of Direction 1 to L-38. The step was taken to allow some of this equipment to be made for use in homes of West Coast war workers who are forced to live under hot, dry conditions because of the location of certain war plants.

These "desert" coolers, designed to lower the temperature of air by the evaporation of water, consist primarily of a fan powered by a fractional horsepower motor and an evaporative medium, such as wetted excelsior.

To obtain permission to manufacture some of these coolers, WPB required the manufacturer to file with his Field Office an application showing: (1) The total number of coolers which he wished to produce; (2) The number of motors available from used stocks, his own or another manufacturer's stocks, or from frozen or idle stocks listed with WPB; (3) The amount of other materials which would be required; and (4) The number of production workers necessary for assembling these coolers and where they fit into his war work, if any.

To get any motors or other materials, unavailable because of lack of priority ratings or ability to meet requirements of Priorities Regulation 13, the manufacturer could apply on form WPB-1161 for permission to purchase such materials from the frozen, idle, or excess stocks of a holder who is qualified to make a special sale of those materials under Priorities Regulation 13. If he had such frozen, idle, or excess motors in his own inventory, he had to include his request to use these in his letter of application to produce. It is the intent of WPB that only frozen, idle, or excess materials will be used in making the coolers. An authorization to purchase the needed materials will be issued if the production is allowed; but no preference ratings are to be assigned.

Sales of coolers made under this Direction may be authorized only by the local WPB offices in San Francisco, Los Angeles, or Phoenix, Ariz., and manufacturers cannot make deliveries on orders authorized by any other offices. Authorizations are being limited to the three offices named because WPB intends to limit sales to the arid Western region. Purchase authorizations also will not carry ratings, because it is not intended that a person supplying such coolers shall replace in his inventory any motors or other materials used to make them. WPB-1319 should be used by prospective purchasers.

ADVERTISING AWARD

Nash-Kelvinator's advertisement, "I'm Not Playing for Marbles," has been selected by the Wartime Adver-

. . . to improve the operation of your condensing units

CONDENSING UNIT MANUFACTURERS: Here's some "help" you can hire, and they won't have to get a release from the War Manpower Commission—they can start to work for you right now!

Yes, Temprite's Oil Separators and Accumulator-Interchangers, together with their engineers, are ready to go to work for you anytime you need them—whether it be for immediate or postwar needs.

For example, auxiliary equipment such as oil separators and heat exchangers play an important part in the operation of low temperature refrigeration equipment, but very often not enough consideration is given to these important items, in the design and construction of basic equipment.

This is where our engineers can be of help to you in working with your designers on the application of our standard Oil Separators and Heat Exchangers. Where these items do not meet the exact requirements our engineers are able to evolve special designs for your individual problems.

If you are redesigning your condensing units perhaps our engineering staff can be of assistance. A letter today to our sales department will bring you full details.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous Liquid Cooling Devices

41 PIQUETTE AVENUE . . . DETROIT, MICHIGAN

tising Awards committee as one of the 100 most outstanding advertisements of 1943. The company says it has received more than 25,000 requests for reprints of its "inspirational" series of advertisements.

NO NEW REFRIGERATORS FOR CANADA NOW

A proposal for resumption of electric refrigerator production for the Canadian civilian market has been cancelled by D. P. Cruikshank, metals coordinator of the Wartime Prices and Trades Board of Canada.

Cancellation of the plan was due, not so much to the shortage of sheet steel, but to the lack of component parts, the bulk of which would have had to be imported from the United States. There still is a small stockpile of electric refrigerators in the country, Mr. Cruikshank said, but these are available only to the most essential users, such as hospitals.

Civilian production of washing machines had been permitted by the Prices and Trades Board because manufacturers had some spare parts on hand. However, there were no parts available for electric refrigerators.

SAFETY AWARD TO VIRGINIA SMELTING

Employees of Virginia Smelting Co. have been awarded the American Mutual trophy for achieving a safety record of over 1,000,000 man-hours of work without a lost time accident.

The award covers an operating period from March 28, 1942 to May 2, 1944.

A. B. Butt, Jr., plant personnel director and safety committee chairman, received the trophy on behalf of the management and employees at a recent statewide safety conference in Roanoke, Va. In accepting the award, Mr. Butt paid tribute to the cooperation of each and woman on the company's staff.

This citation elevates Virginia Smelting Co. to top position for safety record among 22 statewide chemical plants, and high in national score for chemical plants of equivalent classification.

Over the COUNTER

FRANK: "Jim, give me a dozen 8-inch driers and eight 16-inch driers, and a 60-pound drum of methyl—and hurry it up, can't you? It's hot today and I've got twice as much work as I can do. Seems like when they're passing laws, they ought to think up one for a 40-hour day—I could sure use it!"

JIM: "Gosh, Frank, what do you do with all those driers you've been ordering? You use more than any one-man organization that comes in here."

FRANK: "I'll tell you something, Jim. I've found that every time I install the correct size drier on one of my jobs, service is reduced and I practically never have a call-back. By doing this I have less calls on each customer, and it lets me take care of more customers—besides, it saves money for them in the long run."

JIM: "Sounds like a good idea. You'd think in days like these when there aren't enough servicemen to go around, more fellows in your sort of job would work on the same basis. Here's your stuff—and oh, yes . . . here's a little back-order that came in for you just yesterday. You ought to be able to use 'em; I imagine your stock's pretty low by now."

FRANK: "OK, boy, pass 'em out. I'm due on my first job pretty quick."

JIM: "That's another thing I've noticed about you, Frank. You're generally my first customer in the morning—a lot of the fellows pick up most of their stuff on their way home."

FRANK: "Well, when I saw the way things were going, with no additional help to be had for love or money and more calls than ever to take care of, I sat down and figured out a plan that takes care of all my old customers who really need help.

"First thing every morning, while the coffee's cooking, I route my calls so I don't have to back-track all over town and burn up a lot of extra gas. And while I'm going going over the calls, I jot down the materials I figure I'm going to need—and I pick them up here before I start out on the route."

JIM: "But sticking to a route all day will put you in a hole if you have an emergency call, won't it?"

FRANK: "No, it don't—and I'll tell you why. I call my office after I've finished each job—and besides, when I follow a regular route they know where to find me if anything hot comes up.

"But that's where my plan comes in and really pays off. Instead of brushing my jobs off in about 10 minutes, like I used to do, I sell my customers a good thorough job when I'm there. When you take the time to really sell a good job, you don't have many emergencies—and best of all, you cut down on an awful lot of this night and Sunday work.

"I've got the thing working good enough now so that the wife and I can do the book-work after supper—and we've even got time for a movie every now and then, if we can find somebody to look after the youngsters while we're gone.

"But Cripes! I'm not going to keep on my schedule if I stand here and bang ears with you all day. I'll just about make my first call on time—if the cops are looking the other way. So long!"

PACKAGING KIT

Frigidaire has announced the beginning of distribution through its dealers of a frozen food packaging unit to retail at about $8.75. The kit contains enough freezing supplies, such as cellophane-lined boxes and bags and other non-critical materials, to package some 175 different items.

NEW CANADIAN DISTRIBUTORS

The Air Conditioning Engineering Co., 361 Youville Square, Montreal, has been appointed sole distributor in Canada for Spoehrer-Lange Co., St. Louis valve manufacturer.

Air Conditioned automobiles may not be entirely in the dream-world class, judging by a patent recently issued to a Detroit inventor and assigned immediately to one of the nation's foremost producers of higher-priced pre-war cars.

The new device is intended for all closed-body types. It consists of a refrigerating system operated by the motor through a thermostatically controlled clutch. When the inside temperature of the car rises above a predetermined level, the clutch slides in and picks up the cooling system. The principal patents are issued on the thermostatic clutch mechanism.

The refrigerating unit is placed directly behind the rear seat of the car, with the cooling elements directly in front of the radiator.

Motor car designers have long been searching for a practical automobile cooling system, needed especially for the long trans-desert trips through the southwest.

A new electronic machine able to destroy germs in packaged foods was displayed recently at the Institute of Food Technologists' meeting in Chicago. The germ-killing effect is produced by a high-frequency field which induces heat inside the package, sterilizing its contents and killing spoilage organisms.

By using pigeons to bring in orders the manager of an auto-parts store in California has developed a novel and efficient service. Unable to obtain telephones in a new location, because of wartime priority tangles, he hit upon the happy idea of giving pigeons to his customers to bring in their orders.

A pigeon fancier since boyhood, the manager had 125 trained birds available, and soon they were winging their way to his store, carrying orders in the small metal cylinders fastened to their legs. Business not only came back—it rose to new high levels, customers getting a kick out of using this novel "sales force." Sometimes returning pigeons were used to bring back small parts which would fit into a message capsule. The average trip took from five to fifteen minutes.

After three weeks of this, the dealer finally got his telephones—but the idea worked so well that he has established a regular "emergency" pigeon service for repair men who go out on a job without knowing exactly what parts will be needed, and who can't find a telephone handy.

Streamlined, windowless, and nearly noiseless trains, designed to eliminate standees and provide a seat for every passenger, may make subway riding more pleasant for tomorrow's commuters. According to plans formulated by one industrial engineer, even change booths would be done away with in favor of a new type of turnstile which would not only accept any coin but make change in the bargain.

Cooked frozen foods are beginning to edge their way into retail and institutional markets, and are being produced now in over half a dozen plants. Also appearing in retail packages are new combinations of fruits and vegetables, which already have met with good consumer reaction. Recently perfected is a new method of processing an overrun frozen fruit dessert, which uses frozen fruit or berry purees for its base and flavor and requires no milk solids in its manufacture.

Army Quartermaster Corps laboratories have developed a method of drying and preserving whole milk so that it will keep for a year under tropical conditions. Dried milk made by methods now in use becomes rancid in the tropics. In the Army formula, the water content of the milk is reduced to 2.23 percent, and an inert gas is introduced into the airtight container as a preservative.

Fire in the cargo space of an airplane can now be detected automatically. Any trace of smoke in the cargo space lights up a red lamp on the instrument panel and sounds an alarm. If the space is protected by a built-in CO_2 fire-extinguishing system the pilot simple pulls a lever on the instrument panel and the space is immediately filled with gas.

Air shipment of fruits and vegetables are planned by Atlantic & Pacific Tea Co., with the first shipments scheduled to be made to Detroit from midwestern market gardens via United Air Lines.

RAYON FIRM EXPANDS USE OF REFRIGERATION

With the greatly expanded use of rayon for cords and fabric in heavy-duty tires, centrifugal refrigerating machines have shouldered another vital war duty having much significance to the post-war automobile and airplane age.

Rayon tire cords, according to official reports, give superior wearing qualities to heavy-duty tires for trucks, buses and large planes. Even more important now, the use of rayon cords reduces the amount of rubber required per tire. The weight of the tires is cut down, making them easier to ship and handle—enabling bombers to carry more bombs.

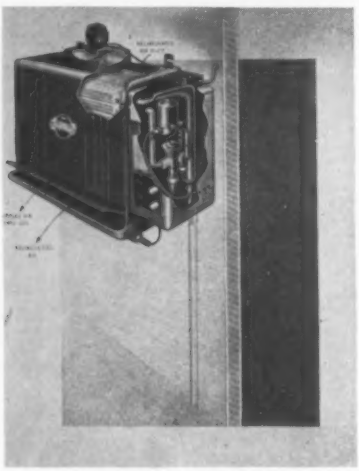
As part of WPB's program to provide sufficient rayon for immediate military needs and for the nation's synthetic rubber tire program, American Viscose Corp. is expanding its rayon manufacturing facilities at Front Royal, Va. Since refrigeration is essential to reconstituting celluose in the form known as rayon, four additional centrifugal refrigeration machines have been added to cool brine. The brine is circulated to the soda, mercerizing, churn mixing, and viscose aging departments. Regulation of temperature is vital in these departments to control chemical processes and produce a standard, high-grade rayon tire cord.

The new centrifugals have a combined cooling capacity of 1,500 tons when lowering the temperature of brine from 17° F. to 10° F. They are driven by steam turbines of the back-pressure type.

Food Conditioner

A new cooling unit, combining controlled high humidities with cooled air, has been announced by American Coils Co., Newark, N. J. The manufacturer is now able to offer these units for replacement equipment on orders with a priority rating of AA5 or better under L-38.

This refrigeration system is of wall mounted, one man hanger type, and designed for use in walk-in boxes. Temperatures are automatically controlled down to 35°F. and relative humidities up to 93%. It is particularly suitable for preserving fresh meats, fruits and vegetables; and for



dough retarding, storage of eggs, butter and cheese, bakery and confectionery products, tobacco etc.

All parts and controls are furnished complete. The cabinet is fabricated of heavy gauge metal finished in an oven baked ripple of maroon and black colors. The coil is completely enclosed; copper tubes are expanded into individual, serrated, aluminum fins. Return bends are welded at 1270°F.

All that is necessary to install the unit is to run a 110-volt line to the junction box mounted on top of the instrument panel, and connect the liquid and suction lines to the condensing unit.

Farm Freezer

Sanitary Refrigerator Co., Fond du Lac, Wis. has announced a new 15 cubic-foot low temperature storage cabinet designed for the average farm family. Interior freezer plate arrangement provides a separate compartment for freezing which has a capacity of 2.5 cubic feet, while the five separate frozen storage compartments provide 12.5 cubic feet of frozen storage. A ⅓ H.P. cooling unit supplies the refrigeration. The new model will be available when present restrictions are removed.

Retractable Tubing

Wiremold Co., Hartford, Conn. has developed a retractable tubing which is designed to provide portable duct connections for cold or heated air. It will come in five standard inside diameters from 4 inches to 12 inches, but will be available on special order in other diameters. Lengths can range from 2 to 50 feet. Fabrics used in its construction can be fairly light weight cotton, synthetic rayon, heavy duck, or others. Made of lightweight material, a 15-foot length of tubing can be stowed in a container 1 foot thick, it is claimed.

Round cross-section of the tubing is maintained by four spirals of wire (fewer in heavy materials) to each foot of length. Tubing ends can be varied to meet specific requirements, such as attachment to a particular type of blower equipment or connecting lengths to one another. Indicated uses include cooling ship holds, preheating airplane engines, ventilating process tanks, and conducting heat to temporary buildings.

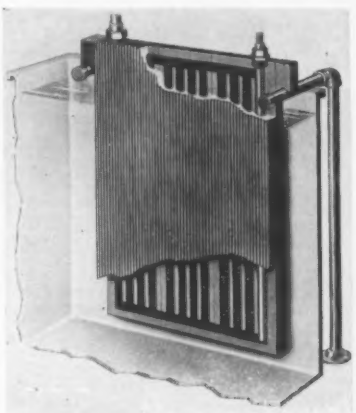
Forged Steel Purger

A forged steel purger for removing air and other noncondensible gases from refrigerating systems has been developed by Armstrong Machine Works, Three Rivers, Mich., which also manufactures cast semi-steel purgers. The new purger is designed for high-pressure CO_2, ammonia, and Freon systems and for service where engineers prefer all-steel construction. The purger is hooked up to both the condenser and the receiver and is claimed to keep the system free of non-condensibles without appreciable loss of refrigerant gas.

The name "Home Freezer" has been suggested by the refrigeration section of National Electrical Manufacturers Association to designate sub-freezing refrigerators for home storage of frozen foods. Nema describes a "home freezer" as "the household type of low temperature, mechanically refrigerated cabinet used exclusively for the freezing and/or storage of frozen food."

Plate-Type Exchanger

The National Carbon Company, Inc., has developed a compact and sturdy new type of corrosion resistant "Karbate" heat exchanger which is said to meet the need for a chemically inert, mechanically strong heat-



ing (or cooling) unit for use in pickling tanks and other metallurgical applications. The "Karbate" material from which the heater is made is an impregnated graphite impervious to liquids under high pressures; it is said to possess high heat transfer values and to be resistant to practically all acids, alkalis and solvents.

The exchangers are of plate type, employing the principle of extended, or corrugated, surface to attain maximum heat transfer area without bulkiness. There are four standard design groups incorporating both parallel and series flow channels, providing 30 different combinations to meet a wide range of heating and cooling requirements.

THE PRACTICAL REFRIGERATION ENGINEERING MANUAL and REFERENCE LIBRARY

II. THE SECOND STEP IN DEVELOPING AN APPLICATION ENGINEERING PROBLEM IS TO DETERMINE TOTAL SERVICE LOAD

CHAPTER II . . . SERVICE LOAD

By
Harold Smith

AUTHOR'S NOTE

THIS Manual has been written expressly to meet the needs of the many workers in the refrigeration industry who do not have formal training in engineering.

The engineering information presented in these articles has been assembled from the many books on refrigeration already available, and is presented in a simplified, easy to understand style which is designed to enable any person possessing a reasonable working knowledge of refrigeration to safely and satisfactorily select equipment which will obtain the results desired under a variety of conditions.

All necessary data—rules, tables, factors — has been grouped together for convenient reference and usage.

The opening Chapter, appearing on these pages last month, was devoted to a discussion of Heat Flow. Chapter 3, to appear next month, will deal with Product Load, a factor of equal importance in determining the total refrigeration load.

While these articles do not constitute a complete course in refrigeration engineering, careful attention to and use of the information presented will enable the service man to work out satisfactory specifications for most types of applications.

The service load is apt to vary considerably, with different refrigeration processes and usage. The first thing we must do is to consider the various heat factors making up the service load. Refrigeration used for processing usually has a heavier service load than do storage or service refrigerators.

The service load often can be figured quite accurately, and should be whenever possible. However, with many new applications, the customer does not have full knowledge of the exact usage of the equipment and is unable to furnish accurate information.

The principal items comprising the service load are: infiltration of warm air from opening and closing doors and windows, in loading and unloading the refrigerator or in service to customers; people working within the refrigerator; electric lights, motor heat on power equipment used in processing; forced air induction for ventilation purposes.

Each of the above factors produces a definite quantity of heat which can be measured to complete a service load. Table "C" gives the different service load factors.

With the proper information and the table below, accurate service load figures can be worked out for any job. In cases where loading and unloading is done only at infrequent intervals, the 1.1 factor need not be used. However, any job loaded and unloaded once a day should include these figures.

All of the service load usually comes during the working periods of the day. During the night, when the business is closed there may be no service load. However, as it is necessary to determine the maximum daily load to satisfactorily estimate the capacity of the refrigeration machinery required, the heavy period of service should be used in securing refrigeration load figures.

When complete information is not available for estimating the service load, or for those who do not wish to figure a load in detail, a simple formula for estimating the service load is shown in Table "D".

Table "D" should be used when processing is employed, as the load for people working and heat induced by lights, motors, etc., makes too much service load to try to cover it with a simple formula.

While the answer to Example 1 may seem to be decidedly out of line, it must be remembered that the simplified form covers only the service

Table "C"—Service Load Factors

People at Work—No. people x 550	equals B.T.U.'s per hr.
Lights or Motors in Use in Cooler—Total watts x 3.5	" " " "
Service In and Out of Cooler—cu. ft. capacity of cooler x 1.1	" " " "
Infiltration of air—cu. ft. capacity of cooler x 0.4	" " " "
Controlled ventilation—cu. ft. air per minute x 30.0	" " " "
Add 10% for safety factor.	

BTU's . . . *Continued from page 11*

During 1943, refrigerator car service improved loaded-empty mileage ratio by 13.8 per cent, raising loaded performance to 64.4 per cent of total mileage operated.

Refrigerator cars averaged more miles a day in 1943 than in previous years. The daily average now is in the neighborhood of 80 miles—in January of this year it reached an all-time high of 87 miles a day. Some new types of refrigerator car equipment, used for the first time last year, contributed to heavier loading, ODT said. They were the overhead ice bunker car and the end ice bunker car, both of which provide about 20 per cent more loading space for perishable products.

WPB ON BEVERAGE INDUSTRY

INEXPERIENCED operators and long hours of use are accelerating the rate of wear on beverage industry machinery, increasing the demand for repair parts, members of the industry's advisory committee have told WPB. Normally repair parts production amounts to about 25 per cent of total beverage machinery manufacture, but the strain on existing equipment has increased this phase of operations to 35 per cent. Chief obstacle to repair parts production is the industry's present rating of AA-5, the committee said. Raising this to AA-3 for 25 per cent of the industry's CMP authorization would afford adequate relief in securing such "tight" components as roller bearings and chains, it was agreed.

Table "D"—Simplified Formula For Estimating Service Load

Type of Refrigeration	Heavy	Medium	Light
Service (Walk-in Coolers)—Total outside sq. ft. area x	4.0	3.0	2.5
Reach-in Coolers and Display Cases—Total outside sq. ft. area x	4.5	3.5	3.0
Storage Coolers (under 1000 sq. ft.)—Total outside sq. ft. area x	4.5	3.5	3.0
Storage Coolers (over 1000 sq. ft.)—Total outside sq. ft. area x	5.0	4.0	3.5

in and out and the infiltration. If we add the figures for one person working and 200 watts of light, we then have a figure totaling 2810, slightly in excess of the detailed figures.

infrequent opening of doors and loading, cooler opening from a vestibule, or low average temperatures of 70° or less outside the cooler.

At the end of Chapter 1—Heat Flow—we set up an example to

Example 1

Butcher Shop Cooler (service) 10′ x 8′ x 10′

We will first use Table "C". As this is a butchers' service cooler there will be no one working in cooler other than for short intervals, not over one person for one hour.

Load 1 person x 550	equals	550	B.T.U.S.
Lights, two 100 watts—200 watts x 3.5	"	700	"
Service In and Out, cubic foot area, 800 x 1.1	"	880	"
Infiltration, cubic foot area, 800 x 0.4	"	320	"
Total		2450	"
10% safety factor		245	
Total estimated service load		2695	
Using the simplified formula for service cooler, medium load factor		3.0	
Outside sq. ft. area, 520 sq. ft. x 3.0	equals	1560	"

When using the simple form it is necessary to give considerable thought to the conditions of service so as to properly determine whether to use heavy, medium or light factors. Usually heavy service loads represent frequent opening of doors and windows, long loading periods, or high temperatures 90 to 120° outside the cooler; medium service loads, average usage, no long loading periods, temperatures 70 to 90° outside cooler; light service loads, determine the heat leak in a box 8′ x 10′ x 9′. We will assume the box is a service cooler with medium service in average temperatures and will use the formula for medium service, simple form.

Outside sq. ft. area 484 sq. ft. x 3.0 equals	1452	B.T.U.S.
We now have:		
Heat Leak	1597	B.T.U.S.
Service Load	1452	"
Total	3049	

MRO RULES MADE CLEARER

WPB has clarified the use of the maintenance, repair and operating supplies (MRO) procedure for obtaining capital equipment by issuing an amended interpretation (No. 11) to CMP Regulation 5 which provides that, while all labor costs involved in making the material or equipment must be figured in the cost of such an addition, the labor used in constructing or installing the equipment does not have to be included.

This rule applies whether or not the installation work is done by a company's own employees or by an independent contractor who supplies his own labor. It also applies where the owner gets an independent contractor to furnish materials and labor for the job, and where the owner of the plant buys a machine and has the seller do the installation work.

The same general rules apply to determining the cost of materials needed for installation or relocation of equipment under Direction 15 to CMP-5, which permits materials costing $500 or less to be used for relocating equipment which is already in a shop or plant.

Under CMP-5, a company can apply its own MRO rating to get materials and equipment for minor capital additions where the cost does not exceed $500, excluding the purchaser's cost of labor.

STRETCH . . .

Continued from page 13

important part in assuring full equipment and participation by the armed forces.

A third feature of the program is the preparation of a "Refrigerator Dispatcher's Routine Question Card." This card, 9″ x 14″, is to be hung at the telephone locations of service agencies and lists specific questions for the dispatcher to ask, so that accurate information will be secured in the least possible time. It is believed that these questions, if properly handled, will eliminate a number of unnecessary service calls where cold controls have not been reset, where refrigerator cords have dropped out of their outlets, or where a main fuse has blown.

In addition to taking these steps within the industry, the cooperation of the public also has been solicited. A folder enclosed in the June power company bills was aimed at two purposes: it suggested steps which should be taken by the refrigerator owner to prevent a breakdown, and provided him with a sticker to paste inside his refrigerator door and on which was given the information which should be provided to the refrigeration service agency when a trouble call was reported.

Protective steps suggested to the refrigerator owner were that he check to see whether his refrigerator was arranged to permit sufficient circulation of air, that overcrowding of the refrigerator be avoided, that he defrost his refrigerator regularly, and that he make sure that the condenser was free from dust.

"Be Considerate," urged the message on the sticker to be attached inside the refrigerator door. "Hundreds of the city's experienced refrigerator repairmen have joined the armed forces. Those who remain are striving desperately to provide essential repair service in order to conserve food and to avoid spoilage.

"Don't make final arrangements for repair with more than one company. All are busy and none should be expected to make unnecessary calls.

"Don't bother the repair company by additional phone calls after arrangements have been completed.

"Be sure to be at home at the time scheduled for the repairman's call."

As a further measure of support to the summer servicing "intelligence campaign," the seven department stores in the Washington area have promised to devote one of their window displays to stressing the special need for care of refrigerators during the hot season.

The activities of the institute during the past year, in an effort to maintain essential refrigeration repair service, have been many-sided. One of the major factors in retaining essential refrigerator mechanics was the filing of a "Group Replacement Schedule" with the State Selective Service offices in the District of Columbia and Maryland. In these schedules the mechanics of over 40 repair agencies were grouped, and an orderly withdrawal of men was provided. Assistance to repair agencies in the presentation of individual cases of mechanics before their local draft boards also played an effective part in assisting the repair agencies.

A series of training schools for refrigeration mechanics recruited and placed in the industry approximately 40 apprentice mechanics. These men were secured from other industries, were trained during a 12 weeks' evening course, and placed with individual repair agencies. Their training in the theory of refrigeration and component parts made it possible for them more quickly to advance when they actually entered the field under an experienced mechanic.

Refrigeration Dispatchers

Routine Question Card

ELECTRIC INSTITUTE • Pepco Bldg., 10th & E Sts. N.W.

1. WHAT IS THE MAKE OF YOUR REFRIGERATOR?

How old is it?
Your name please.
Address?
Phone?

2. WHAT SEEMS TO BE WRONG WITH THE REFRIGERATOR?

COMPLAINT A—IT DOES NOT RUN

Questions

Does the refrigerator have a light inside?
Does the light come on when the door is opened? (if not)
Is the cord plugged into the electric outlet?
Have you tested the electric outlet—the fuse may be blown?
Is the cold control switch inside of the box in the ON position?

COMPLAINT B—THERE IS NO REFRIGERATION

(This applies when mechanism is operating but does not provide refrigeration)

Questions

Is the cold control switch inside of the box on the ON position?
Does the mechanism run all the time?
Is there any gurgling sound in the food compartment?
Is there any frost on the freezer?
Does it make ice cubes?
Is the belt broken?
Is there any on and off click (starting and stopping?)
Is there any hum coming from the motor?

COMPLAINT C—THE REFRIGERATOR IS NOISY

Questions

What sort of noise is it?
A rattle? A Thumping Noise? A Knock? A Ping?

COMPLAINT D—THE BOX IS TOO COLD

Question

Have you checked to see that the cold control setting is at normal?

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

NOTES

In most cases of difficulty the customer should be advised to pull out the plug and wait for the service man.

While this list cannot be complete for all boxes or type of difficulty, it does cover the great majority of cases. By using this routine question list much time can be saved and many service calls avoided.

Time is short like everything else—BE BRIEF.

The MARKET Place

The rates for this department are as follows: minimum charge—$2.00, 25 words. Each additional word, 10c.

Bold type or all capitals: minimum charge—$3.00, 25 words. Each additional word, 15c.

Box number or address not included in word count. All classified advertising payable in advance.

Address all communications to this department:

CLASSIFIED ADVERTISING DEPARTMENT
THE REFRIGERATION INDUSTRY
812 HURON ROAD
CLEVELAND 15, OHIO

SITUATIONS WANTED

JOBBER SALESMAN or Sales manager, eight years experience as salesman for old established Jobbing house. Interested in position with good income and good future possibilities. Good record, good habits, draft exempt, can furnish references. Married, steady and reliable. I am only interested in a position with a well established company, where my past experience can be used to mutual advantage. Write Box A64, Refrigeration Industry.

SERVICE ENGINEER, 10 years experience service and installation work in dairy and ice cream field, now in midwest, would like to locate in west or southwest, health reasons. Over draft age. References furnished. Box A70, Refrigeration Industry.

SERVICE MAN, experience most types of household units, some commercial, would like to locate in Minnesota or Wisconsin, personal reasons. Box A71, Refrigeration Industry.

JOBBER SALESMAN, ten years selling for Eastern Jobber, would consider sales position in Colorado or Arizona, in dry climate, because of throat condition. Have good past record and can furnish good references. Married, out of draft. Write giving full particulars and starting salary. I can sell and can get results. Write Box A-65, Refrigeration Industry.

HELP WANTED

ENGINEER, with testing laboratory experience. Only interested in man with good background. Location middle west. Fine opportunity for future promotion, great post war expansion plans under development. Must furnish good reference and be available at once. Advice draft status and give complete details of past experience in first letter. Write Box B66, Refrigeration Industry.

SALES ENGINEER, Eastern Jobber offers position with fine possibilities to experienced Jobber salesman. Salary and commission basis. Give full details about yourself and your experience in first letter. Our men know of this advertisement. Write Box B67, Refrigeration Industry.

SHOP SUPERINTENDENT, must have ability to train and handle men. Thorough knowledge of compressor rebuilding, motor repair, and general shop practice required. Permanent position, well established organization. Advise experience and salary requirements first letter. Box B69, Refrigeration Industry.

Have opening for refrigeration engineer with experience in service, installation and field work.
Splendid position with growing concern with post war opportunities. Starting salary of fifty-five weekly.
If interested kindly furnish references, prior experience, age, dependents and picture.

Write Box A47, Refrigeration Industry.

MERCHANDISE WANTED

Hermetic Charging and Purging Kit, any make, new or used. S. Miller, 233-155th Street, Calumet City, Ill.

BUSINESS OPPORTUNITIES

Individual with extensive jobbing experience would like to locate partner for new jobbing business in middle west, man with experience and some capital required or will consider buying interest in established jobbing business. Write full details, Box C68, Refrigeration Industry.

EQUIPMENT FOR SALE

ICE REFRIGERATED BOTTLE COOLERS. Three-case capacity. Streamlined. All steel, heavily insulated. Casters. Also useful for cooling fish and other products or storing cracked ice in hotels or taverns. Suitable for homes. $19.00 net each, f.o.b. Philadelphia. Brand new. No priority required. GENERAL REFRIGERATOR COMPANY, 860 North Broad St., Philadelphia, Pa.

DRY BOTTLE COOLERS. ELECTRIC. Equipped with vending machine, blower coil, and self-contained ¼ H.P. Universal compressor ready to plug in. Brand new. Streamlined. No priority required. Vending machine easily removed, increasing capacity to 100 bottles. Only a few left. Price $132.50 net. GENERAL REFRIGERATOR COMPANY, 860 N. Broad Street, Philadelphia, Pa.

CLASSIFICATION OF FOODS

WITH the approach of the season when fresh fruits are most plentiful, OPA reminds processors, distributors, and users such as ice cream companies that fruits, vegetable, and juices frozen in the natural state for "later processing" or packaging are classed as "processed foods." This is true even if the foods are frozen in their natural state for only a few days before being used. Reports to OPA should be made at the time of initial freezing.

AMINCO OIL SEPARATORS

Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from ⅛ H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

AMERICAN INJECTOR CO.
1481 - 14th AVE. DETROIT 16, MICH.
Van D Clothier, 1015 E. 16th, Los Angeles
George Boone, Rm. 739, 1775 Broadway, New York
W. H. Cody, Santa Fe Bldg., Dallas
Export: Borg-Warner, 310 So. Mich., Chicago

Thawzone is not only excellent for most cases of moisture in refrigeration systems, but, paraphrasing a famous slogan, it is good for that last drop of moisture which becomes sidetracked or "trapped."

Thawzone is a *moving* dehydrant. It circulates, searches out that "last drop," destroying it chemically wherever it finds it. Sold by refrigeration supply jobbers in the United States and Canada.

A TINY AMOUNT
→ A BIG JOB ←
SMALL COST

HIGHSIDE CHEMICALS COMPANY
195 Verona Ave., Newark 4, N. J.

THAWZONE
Fully Protected by U. S. Patents
The PIONEER FLUID DEHYDRANT

SEASONAL SERVICING . . .

Continued from page 16

11. Purge air and other non-condensable gases from liquid receiver, using a leak detector to indicate when Freon gas begins to blow.

12. Open liquid outlet valve on the liquid receiver, and allow the piping in the system to build up to about 60 lbs. then close the valve. Now check all the joints, connections, gaskets, flanges and piping with a leak detector. Tighten all bolts and gaskets. If a thorough test shows the system to be free from leaks open the liquid line valve completely allowing the refrigerant stored in the receiver to escape into the system. After a few moments all the gauges should read from 60 to 80 lbs. depending on the room temperature.

13. Start the system up, allowing it to run in the normal manner. Meanwhile, check the oil pressure and oil level. The oil pressure should read from 20 to 40 lbs. above the suction pressure, and the oil level should return to normal after a few moments. Observe the liquid flow indicator. If a solid stream is not visible and all the valves are open, this indicates either a serious obstruction in the refrigerant lines or a shortage of gas, usually the latter. If the charge is found to be low and the system was left with a full charge the previous fall, it indicates a leak which must be found and repaired. If Freon is to be added, it should always be charged through the gauge port of the liquid shut-off valve.

14. Check the expansion valves for proper superheat, which should be 10°F. at the evaporator outlet where the expansion valve bulb is fastened to the outlet of the coil.

15. Check the operation and setting of the water regulating valve and adjust in accordance with the head pressure desired. After the adjustment is made stop the machine to make sure that the water stops flowing completely within one or two minutes.

16. Check the operation of the high pressure cut-out by shutting off the water supply and recording the pressure at which the cut-out stops the machine. The machine should stop when the head pressure reaches between 175 and 200 lbs. and the setting should be adjusted accordingly. It is extremely important that the high pressure cut-out works satisfactorily.

17. Check the operation of the low pressure cut-out by partially closing the suction shut-off valve until the suction pressure is reduced to approximately 10 lbs. at which point the cut-out should stop the machine. Readjust if necessary. The low pressure cut-out is equally as important as the high pressure cut-out and should receive the same attention.

18. If a temporary sight flow indicator was installed for the start-up test it should now be removed after the Service Engineer is satisfied that the system is operating normally and cooling properly. In installing the original piping the air should again be flushed out with Freon.

19. As a last precaution the system should again be checked thoroughly after restarting the air conditioning and condensing unit.

20. Remove all caution tags which were placed on the equipment for winter use and leave the system ready for operation. Remove all test gauges and close the valve to the oil pressure gauge. A conspicuous tag should be placed on the electrical panel giving the Service Engineer's telephone number for both day and night service. This tag should also caution the owner or operator not to make any adjustments to the equipment. However, the owner should be impressed with the importance of keeping the equipment clean and should be especially warned against burying the condensing unit under a lot of refuse or surrounding it with piles of stock or packing cases.

This Inspection Report itemizes all necessary servicing operations.

Air Unit:

1. Repeat the instructions given in paragraphs 1 to 3 inclusive under "Fall Servicing—Air Conditioning Unit." This procedure is the same for the two seasons, and should be carefully done at both inspections.

2. Check fresh air intake dampers, ducts and connections. Check and fill automatic damper linkage.

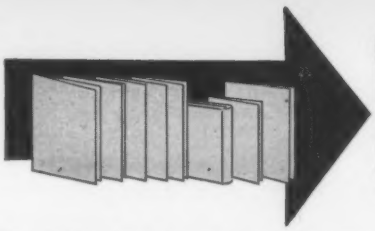
3. Check cooling thermostats and other summer control instruments.

4. Inspect the system while the cooling equipment is in actual operation, to see that it is working satisfactorily.

5. Impress the owner with the importance of keeping clean filters in the system. If this can be done, it will eliminate more unnecessary service calls than any other single cause.

In enumerating the various operations required for complete seasonal servicing it would appear to be quite a lengthy task. Actually, it can be done in just a few hours, except where the installation is rather large and complex, in which case it is generally maintained by an operating engineer in the employ of the owner, and the service engineer is called in only when some major difficulty arises.

If, in performing this occasional service work, the air conditioning service engineer would keep in mind the importance of "preventive maintenance" in eliminating so many unnecessary service calls during the season, he should, in self interest, consider well spent the few more minutes it might take to do a thorough job at this time, rather than having to come back again and again because he has overlooked some minor detail. Elimination of service call-backs assumes added importance today in the light of manpower shortage, gasoline rationing, the rapid deterioration of service cars and the difficulty in obtaining tires.



Useful Literature

The publications featured on this page were written by experts. They are FREE publications. To obtain these write to THE REFRIGERATION INDUSTRY, 812 Huron Road, Cleveland, 15, Ohio. If there is some delay in receiving the material requested, please understand that this is due to our operating with a minimum staff. We shall put through all requests as rapidly as possible.

17—Electronic Relay . . . 8 page bulletin issued by General Electric Co. outlining design and operation of its new CR-7511-A electronic control, and describing applications to which the unit may be put in commercial and industrial uses.

18—Farm Freezer . . . A one-page sheet issued by Sanitary Refrigerator Co., illustrating and describing a new "Quicfrez" farm locker plant of 15 cu. ft. capacity, designed for individual use.

19—Industrial Applications . . . A new, condensed catalog listing refrigeration and air conditioning equipment in industrial production, for temperature and humidity control, refrigeration, and industrial heating. A Carrier Corp. release.

20—Heat Exchangers . . . A 4 page bulletin by Niagara Blower Co. (Bulletin 96) describing the newly developed "balanced wet bulb" temperature control for the Niagara Aero heat exchanger.

21—Home Freezing Hints . . . Tips on how to freeze and store meat, poultry, fruits, vegetables, etc. in the home freezer are outlined in a 28 page booklet which contains advice on types of containers, and handy tables on preparation methods. Issued by Frigidaire Division, General Motors Corp.

22—Coil Catalog . . . A 68 page presentation by Larkin Coils, Inc. of its complete line of products, including coils for refrigeration and air conditioning, air conditioning units, forced convection units, steel and copper vacuum plate coils, evaporative condensers, industrial coolers, etc. One section devoted to special coils.

23—Valve Maintenance . . . Information regarding maintenance of valves and fittings in a 32 page bulletin by Crane Co., Chicago, titled "Piping Pointers for Industrial Maintenance Men." Includes discussion of piping terminology, how to handle valves, fittings, and pipe; how to make screwed, flanged, solder and welded pipe; what to do when valves leak, etc.

24—Metal Bellows . . . A catalog describing "Spring-life" metal bellows, employing a patented method of construction, describing facilities of manufacturer, and application of the bellows as seals or regulators, listing specifications, special problems. A Cook Electric Co. release, available to executives only.

25—Brazing Alloy . . . A bulletin (No. 14) showing how to repair broken cutting tools with "Easy-Flo" low-temperature silver brazing alloy. Covers basic principles and lists typical examples of making repairs. A Handy & Harmon, Inc., release.

26—Electronic Controllers . . . A bulletin (B220) describing a new line of electronic controllers for automatically controlling temperature, pressure, liquid level, and humidity. Gives wiring diagrams, principle of operation, and general description of features. A Bristol Co. release.

27—Tubing . . . A technical bulletin by Bridgeport Brass Co. on the applications and installation of Duplex tubing, a development to overcome corrosion problems too severe for a single metal or alloy. One of the applications described concerns ammonia refrigeration systems.

$ $ $ $ $ $ $ $

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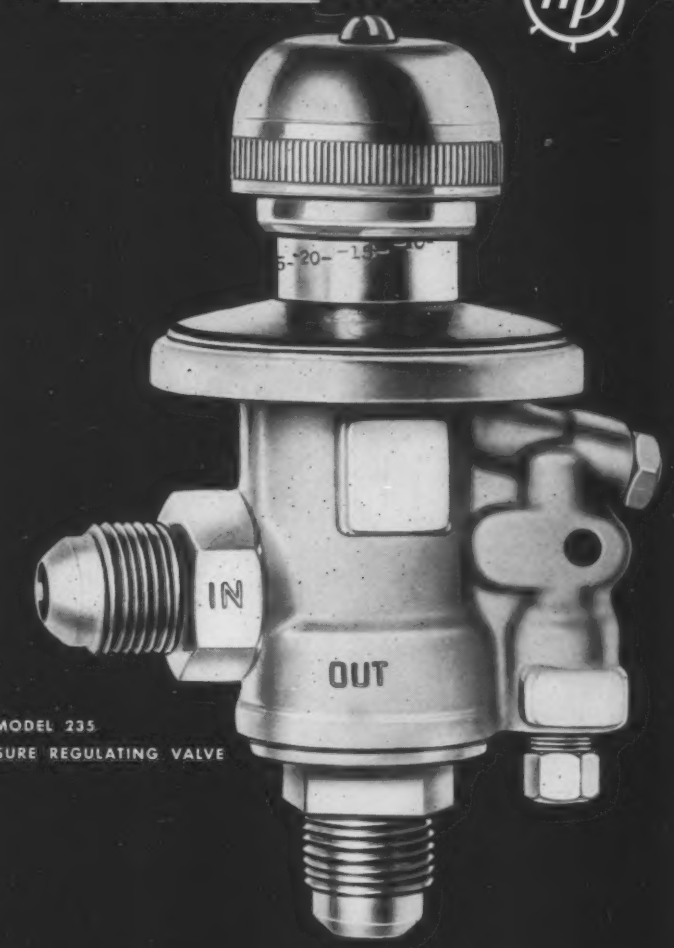

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